HRS DOCUMENTATION RECORD – REVIEW COVER SHEET

Site Name: 68th Street Dump

EPA ID Nos:
68th Street Dump (MDD980918387)
Colgate Pay Dump (MDD980918379)
RM Winstead (MDD003108784)
Industrial Enterprises, Inc. (MDD980918429)

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Pathways, Components, or Threats Not Scored

The ground water migration, soil exposure, and air migration pathways were not scored in this Hazard Ranking System (HRS) evaluation. These pathways are not expected to contribute significantly to the overall site score. Likewise, the ground water to surface water migration component was not scored because it is not expected to contribute significantly to the overall site score.

HRS DOCUMENTATION RECORD

Date Completed: 2/3/03

Site Name:	68th Street Dump
EPA Region:	3
Street Address of Site:	South of Pulaski Highway (Route 40) and 68th Street City of Baltimore and Town of Rosedale
County and State:	Baltimore County, Maryland
General Location in the State:	In the eastern portion of Maryland (Figure 1)
Topographic Maps:	Baltimore East quadrangle, 1953, photorevised 1966 and 1974

Latitude: 39°18′28.68299" N **Longitude:** 76°31′04.39787" W
(Ref. 3 and Ref. 22)*

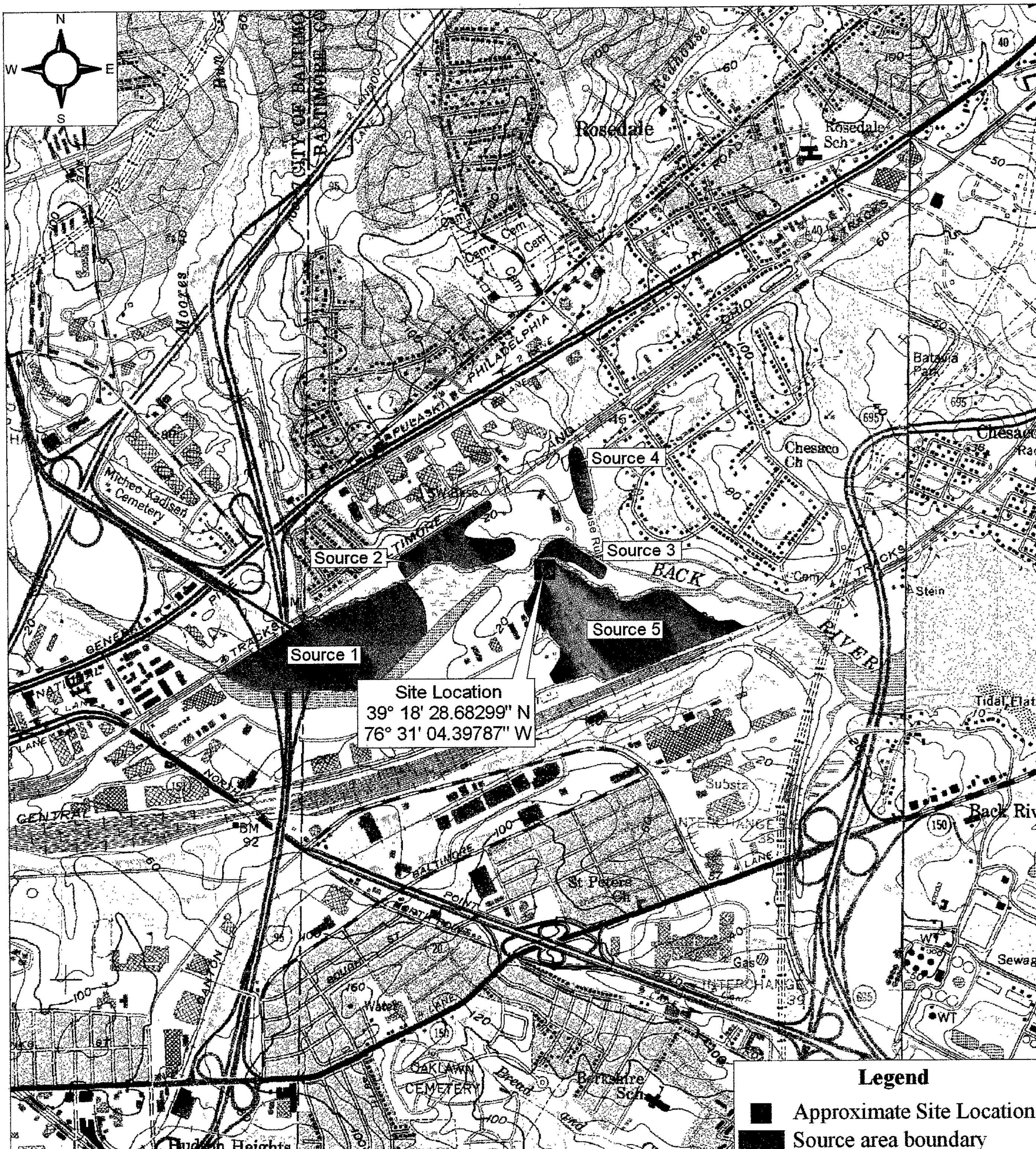
* From the approximate center of the site (see Figure 1).

<u>Pathway Scores</u>

Ground Water	NS
Surface Water	100
Soil	NS
Air	NS

HRS SITE SCORE 50.00

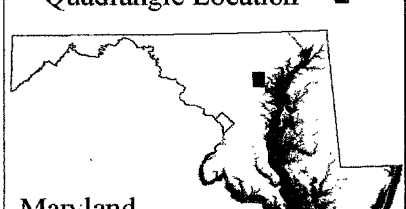
NS = Not scored



Source: Modified from USGS 7.5-Minute Series Topographic Quadrangles,
Baltimore East, Maryland, 1953, Photorevised 1966, 1974
Middle River, Maryland, 1969, Photorevised 1985

0 0.25 0.5 Miles

Quadrangle Location = ■



Maryland

68th Street Dump Site
Rosedale, Baltimore County & City of Baltimore, Maryland

Figure 1
Site Location Map

TDD No. SE3-02-07-021
EPA Contract No. 68-S3-00-02

Tetra Tech EM Inc.

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		50.00

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)]	500	---
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Human Food Chain Threat			
	Likelihood of Release		
14.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics	1,000	1,000
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	–
	19d. Population [lines 19a + 19b + 19c]	b	0.03
20.	Targets [lines 18 + 19d]	b	45.03
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (Continued) 68TH STREET DUMP

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	150
	26c. Potential Contamination	b	0.0065
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	150.0065
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	60
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

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ACRONYMS AND ABBREVIATIONS

CLP	Contract Laboratory Program
E2EM	Estuarine emergent wetlands
EPA	U.S. Environmental Protection Agency
ESI	Expanded Site Inspection
ft	Feet
ft^2	Square feet
HRS	Hazard Ranking System
HWQ	Hazardous Waste Quantity
MD WMA	Maryland Waste Management Administration
MD HSWMA	Maryland Hazardous and Solid Waste Management Administration
MDE	Maryland Department of the Environment
µg/kg	Microgram per kilogram
µg/L	Microgram per liter
mg/kg	Milligram per kilogram
NA	Not applicable
NL	Not listed
NS	Not scored
PA	Preliminary Assessment
PAH	Polyaromatic hydrocarbon
PCB	Polychlorinated biphenyl
PEM	Palustrine emergent wetlands
PPE	Probable point of entry
PSS/FO	Palustrine mixed scrub-shrub forested wetlands
SATA	Site Assessment Technical Assistance (EPA Contractor)
SCDM	Superfund Chemical Data Matrix
SI	Site Inspection
SQL	Sample Quantitation Limit
START	Superfund Technical Assistance and Response Team (EPA Contractor)
TAL	Target Analyte List
TCL	Target Compound List
TDL	Target Distance Limit
VOC	Volatile organic compound

INTRODUCTION

The 68[th] Street Dump site consists of five sources located on land within the City of Baltimore (the portion located along the western boundary) and near the town of Rosedale in Baltimore County, Maryland. The site is bordered to the north by the Chessie Systems Express Transportation (CSXT) railroad tracks (formerly Baltimore and Ohio Railroad), to the south by Quad Avenue, industrial properties and Pennsylvania Railroad tracks, to the east by residential developments, and to the west by commercial and industrial developments (Ref. 3). The five sources that make up the 68[th] Street Dump site were used as landfills from the 1950s through the 1970s (Ref. 6; Ref. 8, pp. 1, 19, 20, 21, 22, 28, 44, and 46; Ref. 10; Ref. 12; Ref. 24; Ref. 28; Ref. 84).

The 68th Street Dump site consists of five source areas, which include four areas previously identified as separate entries in the EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Those four areas are identified as (1) 68th Street Dump (EPA ID No. MDD980918387); (2) Colgate Pay Dump (EPA ID No. MDD980918379); (3) RM Winstead (EPA ID No. MDD003108784); and (4) Industrial Enterprises, Inc. (EPA ID No. MDD980918429). The five source areas are proposed to the NPL under a single site listing because they were used as a single waste disposal location for most of their functional life, although different waste haulers also disposed of waste in one or more of the areas (Ref. 8, pp. 1, 18 through 22, 44, 46; Ref. 9, p. 5; Ref. 13, pp. 2-2 and Appendix B; and Figure 2, which can be found in Appendix A). The majority of the wastes were deposited into a expanse of continuous wetlands prior to landfilling operations, as shown on an aerial photograph from 1938 (Ref. 81, Figure 3). Releases from these sources commingle in adjacent and downstream wetlands, streams, and rivers and impact the remaining wetlands and human food chain fisheries (Ref. 3; Ref. 4, Vol. I, pp. 6 and 15; Ref. 8, p. 24; Ref. 56; Ref. 57; Ref. 68; Ref. 69; Ref. 70; Ref. 71; Ref. 73; Ref. 76). Effective cleanup and protection of the remaining wetlands and downstream fisheries can only occur if the releases associated with all five areas are addressed.

Historical inspection reports and accounts from former employees provide evidence that industrial wastes were disposed of at the 68[th] Street Dump site (Ref. 3; Ref. 4, Vol. I, pp. 6 and 15; Ref. 8, p. 24; Ref. 10; Ref. 56; Ref. 57). Drums and stained soils have been observed at the site during numerous site reconnaissances (Ref. 8, pp. 2, 3, 29, 34, 59, 77 through 83; Ref. 9, p. 5; Ref. 41; Ref. 45; Ref. 62; Ref. 59; Ref. 5, pp. 3 through 5). Investigations completed by EPA document that all types of wastes were accepted at the five sources (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156 and 157). The testimonies of haulers, former employees and responses from industries that contracted with Robb Tyler for waste disposal have been used to identify the wastestreams and hazardous substances in these wastes streams that were disposed of at the 68[th] Street Dump site. Hazardous substances determined to be in these wastestreams include: metals, solvents, paint waste, polyaromatic hydrocarbons (PAHs), acids, polyclorinated biphenyls (PCBs), and pesticides (Ref. 10; Ref. 84; and Table 1 in Appendix B). These same contaminants have been detected in samples collected from all five sources that comprise the 68[th] Street Dump site (Ref. 4; Ref. 7; Ref. 8; Ref. 9; Ref. 13; Ref. 52; Ref. 61).

Three removal actions have occurred at the site. In 1982, up to 23 drums of hazardous waste (due to elevated lead and chromium concentrations) were removed from Source 5 (Ref. 29, p. 2; Ref. 41; Ref. 43; Ref. 44; Ref. 45). In 1984, 10 drums were removed from Source 4; one contained paint sludge, while the remainder were empty and badly deteriorated (Ref. 8, p. 2; Ref. 9, pp. 5 and 7; Ref. 32; Ref. 33; Ref. 35). In 1985, a fire at Source 3 initiated an EPA emergency response action that concluded with the removal of 40 drums partially filled with solvents (Ref. 9, p. 7; Ref. 11, p. 4-1).

Prior to dumping activities began at the site, the area of the 68[th] Street Dump site was covered with 198 acres of palustrine emergent (PEM), palustrine mixed scrub-shrub and forested (PSS/FO) and inter-tidal estuarine emergent (E2EM) wetlands (Ref. 81, pp. 5, 6, and Figure 3). The landfilling of wastes at the site filled in a total of 83.0 acres of wetlands and a total of 10,215 linear feet of adjacent stream frontage was channelized (Ref. 81, p. 15). Surface water bodies that flow through the site include Herring Run, Moore's Run, Redhouse Run, and unnamed tributaries to Herring Run (see Figures 2 and 3 in Appendix A) (Ref. 3; Ref. 20). The Back River and Chesapeake Bay are located along the 15-mile surface water pathway target distance limit (TDL) for the site (see Figure 6 in Appendix A).

Targets within the 15-mile TDL include the Herring Run, Back River, and Chesapeake Bay fisheries and over 23 miles of wetland frontage (see Figure 6 in Appendix A) (Ref 9, p. 6; Ref. 16; Ref. 18; Ref. 68; Ref. 69; Ref. 70; Ref. 71; Ref. 72). Analytical results of sediment samples collected from the Herring Run fishery downstream of the site document contamination with PAHs (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) and lead (Ref. 7, pp. 77 and 207; Ref. 9, p. 162). Analytical results of samples collected from wetlands at the 68th Street Dump site document elevated concentrations of PAHs, PCBs, and metals (Ref. 7, pp. 34, 83, 84, 101, 221, 223, and 224).

A separate HRS score has been calculated for each of the five sources evaluated in this HRS documentation record. The documentation supporting each of these individual scores is provided in Appendices C through G of the Documentation Record.

SOURCE DESCRIPTION

2.2 Source Characterization

Source Number: 1 - Colgate Pay Dump/Original Landfill

Source Description: Landfill

Source Type: Landfill

Source 1 is an approximately 55-acre area located in the western-most portion of the 68th Street Dump site (Ref. 23) (Figure 2, which can be found in Appendix A). The State of Maryland Taxation and Assessment Map for the area shows that Source 1 is located on parcels 213 and 340 (Ref. 5, p. 1; Ref. 9, pp. 72 and 73). A review of property transfer titles indicates that parcel 213 was acquired by Henry and Dorothy Siejack in two transactions, the first in April 1949 and the second in November 1950. In 1978, the State Roads Commission of Maryland acquired the title for parcel 213, and in 1982, the property title was transferred to the Mayor and City of Baltimore (Ref. 5, p. 2; Ref. 4, Vol. I, p. 2). Parcel 340 was acquired by Robb Tyler on October 18, 1951 (Ref. 9, pp. 72 and 73).

On May 20, 1965 a refuse disposal permit no. 65-33-0531 was issued to Henry Siejack for the operation of a landfill on the 24 acres of parcel 213 that is located within Baltimore County (Ref. 24). A permit was never issued to Mr. Siejack for the 18 acres of parcel 213 that is located predominately in the City of Baltimore; however Baltimore County Department of Health inspection reports document that from at least 1953, he also operated a dump at this location (Ref 4, Vol. I, p. 8; Ref. 55). After dumping ceased sometime after 1968, the 24-acre eastern portion of parcel 213 remained vacant and eventually revegetated. The State Roads Commission of Maryland acquired the 18 acres located along the City of Baltimore-Baltimore County boundary for the construction of an interchange ramp for Interstate Highway 95. To provide suitable foundation for the construction of the roadway, the state roads commission excavated 200,000 cubic yards of wastes. These wastes were not removed from the property but were consolidated into five separate mounds that remain on parcels 213 and 340 (Ref. 4, Vol. I, pp. 7 and 15; Ref. 5, p. 1; Ref. 78, pp. 28 and 29). In addition to the waste excavated from the property, the City of Baltimore disposed of an additional 40,000 cubic yards of commercial trash from the Bay View area of Baltimore into these mounds (Ref. 4, Vol. I, pp. 7 and 15; Ref. 26).

On September 16, 1953, the Baltimore County Health Department issued Refuse Disposal Permit No. 11 to Robb Tyler to operate a sanitary landfill on parcel 340 (Ref. 8, pp.1 and 18; Ref. 28). Robb Tyler operated a trash collection business and reportedly collected a large amount of industrial and commercial waste from the City of Baltimore and Baltimore County (Ref. 8, p. 24). Predominately industrial wastes were reportedly dumped on parcel 340 (Ref. 9, p. 13). Inspection reports prepared by the Maryland Department of Health and Mental Hygiene (MD DHMH) in 1955 document various problems associated with disposal of wastes on parcel 340. An inspection report dated January 7, 1955, states that wastes were being deposited along a tributary of Herring Run, causing this tributary to dam up. The reports further notes that "heavy pollution" in the form of an oil slick was observed entering this tributary. The inspectors noted an "exceedingly large amount of barrels" strewn haphazardly on the landfill surface and a pit (measuring approximately 30 by 50 feet), that was being used for disposal of waste oil. A second large pit was being dug at the time of the inspection (Ref. 8, p. 29). An April 1955 inspection report states that the first oil pit had been filled in but that there was "much oil seepage on the ground from the old oil pit" (Ref. 8, p. 32). Oil placed in the two pits was deposited directly above "natural earth" (Ref. 8, p. 33).

The EPA aerial photograph analysis for the 68th Street Dump site indicates that wastes were being deposited at Source 1from at least February 1953 through at least June 1973 (Ref. 6, pp. 6 through 15; Ref. 25; Ref. 78, pp. 10 through 25; Ref. 81). Aerial photographs from 1938 document that the area of Source 1 was predominately covered in PSS/FO and PEM wetlands at this time (Ref. 81, pp. 5, 6, 15, and Figure 3). Historical aerial photographs dated 1950, 1953, 1957, 1964, and 1968 document the filling in of these wetlands with waste as landfilling progressed at Source 1. Eventually, a total of 23.1 acres of wetlands were lost because of landfilling (Ref. 81). Prior to use as an open dump, several tributaries to Herring Run flowed through Source 1. Dumping of wastes at Source 1 filled in these tributaries and diverted Herring Run to the south of its original course (Ref. 6, pp. 10 and 11; Ref. 81, p. 15).

Source Location:

Source 1 is bordered by Moore's Run to the north, Herring Run to the east and south, and tracks for the Baltimore and Ohio (B & O) Railroad to the west. A portion of the total acreage of Source 1 is located within the City of Baltimore; the remainder of Source 1 is located in Baltimore County (Ref. 23; Ref. 24)(Figure 2, which can be found in Appendix A).

Containment:

Release to Ground Water: The ground water pathway was not scored.

Release via overland migration and/or flood: There is no evidence that a maintained engineered cover or functioning and maintained run-on control system and runoff management system was in place at Source 1. There is also no documentation that containment at the source was designed, constructed, operated, and maintained to prevent a washout of hazardous substances by a flood. For these reasons a containment factor value of 10 was assigned (Ref. 1, Tables 4-2 and 4-8).

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

2.4.1 Hazardous Substances - Source 1

Records indicate that many types of materials were disposed of by Henry Siejack at Source 1, including construction debris, fly ash, pesticides, rodenticides, highly flammable material, and industrial wastes (process waste, acids, alkaline solids, and caustic soda) (Ref. 4, Vol. I, pp. 6 and 15; Ref. 56; Ref. 57). Problems reported at the landfill included fires, foul odors, leachate seeps, and "acidic layers" (Ref. 4, p. 8).

Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler and Henry Siejack. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of wastes was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156 and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that predominately covered all five source areas located at the site during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these wastestreams have been summarized in Table 1 in Appendix B. Wastes from most of these generators may have been disposed of at all five of the sources that comprise the site. Interviews of former waste haulers indicate that wastes were dumped at various areas of the site. Drivers were told where to dump their waste by the scale house operator or bulldoze operator after arrival at the dump (Ref. 10, pp.13, 14, 23, 24, 32, 44, 66, 113, 121, 124, 134 and 154). EPA's aerial photography analysis of wetland loss completed for the site supports the conclusion that from the late 1950s through 1968, dumping of wastes was occurring into the wetlands of all five sources (Ref. 81, p. 15 and Figures 3 through 7).

In some cases, available information is sufficient to document that a particular wastestream was disposed of at a specific source. Evidence indicates that wastestreams generated by the following industries were disposed of at Source 1: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; GAF Materials; Armco; Koppers; the O'Brien Company; General Motors; Crown, Cork, & Seal; Lasting Product Company; Bruning Paint Company; SCM (Glidden Durkee, Co.); and the Baltimore Sun. Hazardous substances associated with the wastestreams generated by these industries include trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

Evidence of the hazardous nature of the wastes disposed of at Source 1 is further provided by debris observed during test pit excavations completed in 2000 during the EPA expanded site inspection (ESI). Construction debris, tar pitch, fly ash, oil-laden soils, and drums were all observed in test pit excavations at Source 1 (Ref. 82, Logbook 1, pp. 23, 30 through 33).

Finally, documentation of the disposal of hazardous substances at Source 1 is provided by investigations conducted at the source. The MD WMA completed a preliminary assessment (PA) of the 68th Street Dump site in 1985. A reconnaissance of the area of Source 1 was conducted as part of this PA. During this reconnaissance, numerous 55-gallon drums, with associated multi-colored sludges, were observed protruding from the ground at Source 1 (Ref. 8, pp. 3, 59, 77 through 83; Ref. 59). Samples of the contents of these drums were collected and analyzed for extraction procedure (EP) toxicity metals (Ref. 8, pp. 3, 59, 95 through 105). Analytical results indicated the presence of hexavalent chromium and lead concentrations above EP toxic levels (Ref. 8, pp. 3, 59, 95, 97, 98, 103, 104, and 105). These results document that waste characterized as hazardous, due to the concentrations of hexavalent chromium and lead, was disposed of at Source 1. Hexavalent chromium and lead were known components of wastestreams documented to have been disposed of at Source 1.

Additional samples were collected from Source 1 during three separate sampling events. The first table shown below summarizes analytical data for samples collected by the Maryland Hazardous and Solid Waste Management Administration (MD HSWMA) in 1989, the second table summarizes samples collected by MDE in 1993, and the third table documents samples collected by the EPA Region 3 SATA team in 2000.

MD HSWMA Sample Results -1989

In September 1989, MD HSWMA collected soil samples from three of the five mounds of material excavated from the western portion of Source 1 (Ref. 4, Vol. I, p. 17). The samples were analyzed under EPA's Contract Laboratory Program (CLP) for total metals, VOCs, semi-volatile organic compounds (SVOC), pesticides, and PCBs (Ref. 4, Vol I, p. 19). The table below summarizes the hazardous substances detected at Source 1 during the 1989 sampling event. The concentrations of metals present in background soil samples do not need to be documented for an HRS source type identified as a landfill; however, to determine how the concentration of metals identified at Source 1 compared to the background levels, the metals concentrations detected in the samples summarized in the table below were compared to the concentrations of metals detected in a background sample collected in 2000 during the ESI conducted at the site by the EPA Region 3 SATA team.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
Aroclor-1254	Mound - 1	540 J	160	4, Vol. II, pp. 29 and 40
	Mound - 2	600 J	160	4, Vol. II, pp. 29 and 44
	Mound - 3	520 J	160	4, Vol. II, pp. 29 and 53
Benzo(a)anthracene	Mound - 2	710 J	330	4, Vol. II, pp. 28 and 43
	Mound - 3	570 J	330	4, Vol. II, pp. 28 and 52
Benzo(a)pyrene	Mound - 2	690 J	330	4, Vol. II, pp. 28 and 43
	Mound - 3	480 J	330	4, Vol. II, pp. 28 and 52
Benzo(b)fluoranthene	Mound - 2	880 J	330	4, Vol. II, pp. 28 and 43
	Mound - 3	560 J	330	4, Vol. II, pp. 28 and 52

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
alpha-Chlordane	Mound - 1	110 J	80	4, Vol. II, pp. 29 and 40
	Mound - 2	110 J	80	4, Vol. II, pp. 29 and 44
	Mound - 3	120 J	80	4, Vol. II, pp. 29 and 53
DDD(4,4')	Mound - 1	130 J	16	4, Vol. II, pp. 29 and 40
	Mound - 2	46 J	16	4, Vol. II, pp. 29 and 44
Dieldrin	Mound - 2	41 J	16	4, Vol. II, pp. 29 and 44
Phenanthrene	Mound - 2	510 J	330	4, Vol. II, pp. 28 and 43
	Mound - 3	480 J	330	4, Vol. II, pp. 28 and 52
Pyrene	Mound - 1	520 J	330	4, Vol. II, pp. 28 and 39
	Mound - 2	1,200 J	330	4, Vol. II, pp. 28 and 43
	Mound - 3	980 J	330	4, Vol. II, pp. 28 and 52

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Chromium	Mound - 2	286 J	27.0	2	4, Vol. II, p. 216; 7, pp. 12, 87 and 228
	Mound - 3	115 J	27.0	2	4, Vol. II, p. 216 7, pp. 12, 87 and 230
Lead	Mound - 1	328 J	101	1	4, Vol. II, p. 216 7, pp. 12, 87 and 227
	Mound - 2	497 J	101	1	4, Vol. II, p. 216 7, pp. 12, 87 and 228
	Mound - 3	311 J	101	1	4, Vol. II, p. 216 7, pp. 12, 87 and 230
Nickel	Mound - 1	53	16.3	8	4, Vol. II, p. 216 7, pp. 12, 87 and 227
	Mound - 2	87	16.3	8	4, Vol. II, p. 216 7, pp. 12, 87 and 228
	Mound - 3	56	16.3	8	4, Vol. II, p. 216 7, pp. 12, 87 and 230

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

MDE Sample Results - 1993

In 1993, MDE conducted an ESI at the 68th Street Dump site. As part of this ESI, samples were collected and analyzed for target compound list (TCL) organic and target analyte list (TAL) inorganic compounds, in accordance with EPA CLP protocols (Ref. 9, pp. 18, 20, and 47). The table below documents the concentrations of hazardous substances detected in samples collected from Source 1 during the sampling event. Two samples, Soil-5 and Soil-6, were collected during the ESI to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of metals detected at Source 1. If the substance was detected in both background samples, the sample with the higher concentration was used as the comparative sample.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
Benzo(a)anthracene	Soil-2	910	330	9, pp. 156 and 299
Benzo(b)fluoranthene	Soil-13	520 J	330	9, pp. 159 and 315
	Soil-2	1900	330	9, pp. 156 and 299
Chlordane (alpha)	Soil-2	19 J	1.7	9, pp. 166 and 355
	Soil-3	7.3 J	1.7	9, pp. 166 and 356
	Soil-4	4.2	1.7	9, pp. 166 and 357
Chlordane (gamma)	Soil-2	18 J	1.7	9, pp. 166 and 355
	Soil-3	8.7	1.7	9, pp. 166 and 356
	Soil-4	4.3	1.7	9, pp. 166 and 357
Chlordane (alpha)	Soil-1	2.8 L	1.7	9, pp. 167 and 354
4,4'-DDE	Soil-3	32	3.3	9, pp. 166 and 356
Fluoranthene	Soil-2	2,000	330	9, pp. 156 and 299
Phenanthrene	Soil-2	1,200	330	9, pp. 156 and 299
Pyrene	Soil-2	740	330	9, pp. 156 and 299

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Aluminum	Soil-13	118,000	6,470	40	9, pp. 113, 233, 231 and 232
Arsenic	Soil-2	56.2 L	3.9 L	2	9, pp. 113, 228, 231 and 232
	Soil-3	34.7 L	3.9L	2	9, pp. 113, 229, 231 and 232
Barium	Soil-13	2,250	74.1	40	9, pp. 113, 229, 231 and 232
Cadmium	Soil-13	9.6	ND	1	9, pp. 113, 233, 231 and 232
	Soil-3	101	ND	1	9, pp. 113, 229, 231 and 232

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	CRDL (mg/kg)	Reference
Chromium	Soil-13	299 J	29.3 J	2	9, pp. 113, 233, 231 and 232
	Soil-2	161 J	29.3 J	2	9, pp. 113, 228, 231 and 232
	Soil-3	138 J	29.3 J	2	9, pp. 113, 229, 231 and 232
Copper	Soil-13	2,150	25.8	5	9, pp. 113, 233, 231 and 232
	Soil-2	5,270	25.8	5	9, pp. 113, 228, 231 and 232
	Soil-3	1,240	25.8	5	9, pp. 113, 229, 231 and 232
Lead	Soil-3	2,680	201 J	0.6	9, pp. 113, 229, 231 and 232
Manganese	Soil-1	928 J	240 J	3	9, pp. 113, 227, 231 and 232
	Soil-2	1,190 J	240 J	3	9, pp. 113, 228, 231 and 232
	Soil-3	2,060 J	240 J	3	9, pp. 113, 229, 231 and 232
Mercury	Soil-1	1.8	0.28	0.1	9, pp. 113, 227, 231 and 232
Nickel	Soil-13	113	[6.1]	8	9, pp. 113, 233, 231 and 232
	Soil-2	121	[6.1]	8	9, pp. 113, 228, 231 and 232
	Soil-3	112	[6.1]	8	9, pp. 113, 229, 231 and 232
Selenium	Soil-3	10.4 L	ND	1	9, pp. 113, 229, 231 and 232
	Soil-2	2.9L	ND	1	9, pp. 113, 228, 231 and 232
Silver	Soil-1	4.3 K	ND	2	9, pp. 113, 227, 231 and 232
	Soil-2	6.1	ND	2	9, pp. 113, 228, 231 and 232
	Soil-3	12.6	ND	2	9, pp. 113, 229, 231 and 232
Zinc	Soil-1	1,340	77.0	4	9, pp. 113, 227, 231 and 232
	Soil-2	466	77.0	4	9, pp. 113, 228, 231 and 232
	Soil-3	4,560	77.0	4	9, pp. 113, 229, 231 and 232

Notes:

CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
ND	Not detected above the detection limit
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
K	Analyte present; reported value may be biased high
L	Analyte present; reported value may be biased low
[ ]	Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

EPA SATA Team Sample Results - 2000

Evidence that hazardous substances were disposed of in Source 1 is provided by the results of samples collected by the EPA Region 3 SATA team in 2000. The sampling locations are shown in Figure 2 in Appendix A. The samples were analyzed for organic and inorganic parameters using CLP protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs, and pesticides. The samples collected for inorganic analysis were analyzed for total metals (Ref. 7, p.1). The table below summarizes the hazardous substances detected at Source 1 during the sampling event. To identify concentrations of metals exceeding background levels, metal concentrations detected at Source 1 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
1,1'-Biphenyl	ORLF-WS26B	950 J	330	7, p. 114
	ORLF-WS20B	1,400 J	330	7, p. 112
2-Methylnaphthalene	ORLF-WS11B	550	330	7, p. 108
	ORLF-WS26B	9,300	330	7, p. 114
	ORLF-WS26C	5,200 J	330	7, p. 114
	ORLF-WS12B	560 J	330	7, p. 108
	ORLF-WS02B	1,700 J	330	7, p. 106
	ORLF-WS18B	160,000	330	7, p. 110
	ORLF-WS05B	1,100	330	7, p. 106
	ORLF-WS10B	3,000	330	7, p. 108
	ORLF-WS19B	190,000	330	7, p. 110
	ORLF-WS20B	4,900	330	7, p. 112
4-Chloroaniline	ORLF-WS26B	18,000	330	7, p. 114
	ORLF-WS26C	11,000	330	7, p. 114
	ORLF-WS29B	520	330	7, p. 114
4-Methylphenol	ORLF-WS10B	4,800	330	7, p. 108
4-Nitroaniline	ORLF-WS26B	32,000	330	7, p. 115
	ORLF-WS26C	27,000	330	7, p. 115
Acenaphthene	ORLF-WS09B	610 J	330	7, p. 108
	ORLF-WS11B	660	330	7, p. 108
	ORLF-WS12B	690 J	330	7, p. 108

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Acenaphthene (Continued)	CPLF-WS08B	1,100 J	330	7, p. 130
	CPLF-WS05B	2,400 J	330	7, p. 128
	ORLF-WS26B	20,000	330	7, p. 114
	ORLF-WS26C	14,000 J	330	7, p. 114
	ORLF-WS26B	840 J	330	7, p. 114
	ORLF-WS01B	430	330	7, p. 106
	ORLF-WS02B	1,000 J	330	7, p. 106
	ORLF-WS18B	5,800 J	330	7, p. 110
	ORLF-WS19B	10,000 J	330	7, p. 110
	ORLF-WS05B	530 J	330	7, p. 106
	ORLF-WS20B	11,000	330	7, p. 112
Anthracene	ORLF-WS09B	1,400	330	7, p. 109
	ORLF-WS11B	1,700	330	7, p. 109
	ORLF-WS12B	810 J	330	7, p. 109
	ORLF-WS25B	460 J	330	7, p. 113
	ORLF-WS26B	35,000	330	7, p. 115
	ORLF-WS26A	910 J	330	7, p. 115
	ORLF-WS26C	52,000	330	7, p. 115
	ORLF-WS28B	6,500 J	330	7, p. 115
	CPLF-WS05B	4,600 J	330	7, p. 129
	CPLF-WS01B	180 J	330	7, p. 129
	CPLF-WS08B	850 J	330	7, p. 131
	CPLF-WS02B	1,000 J	330	7, p. 129
	ORLF-WS01B	690	330	7, p. 107
	ORLF-WS02B	1,200 J	330	7, p. 107
	ORLF-WS20B	9,300	330	7, p. 113
Benzo(a)anthracene	CPLF-WS03B	1,300	330	7, p. 129
	CPLF-WS04B	700 J	330	7, p. 129
	CPLF-WS05B	6,900 J	330	7, p. 129
	CPLF-WS01B	790	330	7, p. 129
	CPLF-WS02B	1,900 J	330	7, p. 129
	CPLF-WS02C	460 J	330	7, p. 129
	CPLF-WS06B	660 J	330	7, p. 131

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(a)anthracene (Continued)	CPLF-WS08A	1,800	330	7, p. 131
	CPLF-WS08B	830 J	330	7, p. 131
	ORLF-WS07B	1,100 J	330	7, p. 109
	ORLF-WS09B	2,800	330	7, p. 109
	ORLF-WS11B	3,700 +	330	7, p. 109
	ORLF-WS12B	1,600 J	330	7, p. 109
	ORLF-WS25B	2,900	330	7, p. 113
	ORLF-WS26B	66,000 +	330	7, p. 115
	ORLF-WS26A	4,300	330	7, p. 115
	ORLF-WS26C	140,000 +	330	7, p. 115
	ORLF-WS29B	740	330	7, p. 115
	ORLF-WS28B	14,000 +J	330	7, p. 115
	ORLF-WS01B	1,000	330	7, p. 107
	ORLF-WS02B	1,700 J	330	7, p. 107
	ORLF-WS04B	570	330	7, p. 107
	ORLF-WS06B	670	330	7, p. 107
	ORLF-WS19B	4,500 J	330	7, p. 111
	ORLF-WS05B	1,400	330	7, p. 107
	ORLF-WS20B	3,300 J	330	7, p. 113
	ORLF-WS20A	340 J	330	7, p. 111
Benzo(b)fluoranthene	ORLF-WS07B	2,000 J	330	7, p. 109
	ORLF-WS09B	2,300	330	7, p. 109
	ORLF-WS11B	3,100 +	330	7, p. 109
	ORLF-WS12B	1,300 J	330	7, p. 109
	ORLF-WS25B	3,700	330	7, p. 113
	ORLF-WS26B	41,000	330	7, p. 115
	ORLF-WS26A	4,600	330	7, p. 115
	ORLF-WS26C	150,000 +	330	7, p. 115
	ORLF-WS29B	710	330	7, p. 115
	ORLF-WS28B	7,400 J	330	7, p. 115
	CPLF-WS01B	660 J	330	7, p. 129
	CPLF-WS02B	1,500 J	330	7, p. 129
	CPLF-WS02C	400 J	330	7, p. 129

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(b)fluoranthene (Continued)	CPLF-WS03B	940	330	7, p. 129
	CPLF-WS04B	750 J	330	7, p. 129
	CPLF-WS05B	4,100 J	330	7, p. 129
	CPLF-WS06B	500 J	330	7, p. 131
	CPLF-WS08A	2,100	330	7, p. 131
	CPLF-WS08B	620 J	330	7, p. 131
	ORLF-WS01B	1,100	330	7, p. 107
	ORLF-WS02B	1,100 J	330	7, p. 107
	ORLF-WS06B	740	330	7, p. 107
	ORLF-WS04B	660	330	7, p. 107
	ORLF-WS05B	1,000	330	7, p. 107
	ORLF-WS20B	1,900 J	330	7, p. 113
	ORLF-WS20A	400 J	330	7, p. 111
Benzo(k)fluoranthene	CPLF-WS07B	2,100 J	330	7, p. 109
	CPLF-WS09B	2,200	330	7, p. 109
	ORLF-WS12B	1,900 J	330	7, p. 109
	ORLF-WS25B	2,100 J	330	7, p. 113
	ORLF-WS26B	35,000 J	330	7, p. 115
	ORLF-WS26A	3,200	330	7, p. 115
	ORLF-WS26C	47,000 J	330	7, p. 115
	ORLF-WS29B	680 J	330	7, p. 115
	ORLF-WS28B	7,000 J	330	7, p. 115
	CPLF-WS01B	700 J	330	7, p. 129
	CPLF-WS02B	1,300 J	330	7, p. 129
	CPLF-WS03B	1,100	330	7, p. 129
	CPLF-WS04B	700 J	330	7, p. 129
	CPLF-WS05B	4,200 J	330	7, p. 129
	CPLF-WS06B	530 J	330	7, p. 131
	CPLF-WS08A	1,200	330	7, p. 131
	CPLF-WS11B	2,200	330	7, p. 109
	CPLF-WS08B	730 J	330	7, p. 131
	ORLF-WS04B	650	330	7, p. 107
	ORLF-WS05B	1,100	330	7, p. 107
	ORLF-WS20B	2,000 J	330	7, p. 113

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(a)pyrene	ORLF-WS07B	1,600 J	330	7, p. 109
	ORLF-WS09B	2,800	330	7, p. 109
	ORLF-WS11B	2,700	330	7, p. 109
	ORLF-WS12B	1,500	330	7, p. 109
	ORLF-WS25B	3,000	330	7, p. 113
	ORLF-WS26B	41,000	330	7, p. 111
	ORLF-WS26A	4,300	330	7, p. 115
	ORLF-WS26C	120,000	330	7, p. 115
	ORLF-WS29B	810	330	7, p. 115
	ORLF-WS28B	8,400 J	330	7, p. 115
	CPLF-WS01B	720 J	330	7, p. 129
	CPLF-WS02B	1,600 J	330	7, p. 129
	CPLF-WS03B	500 J	330	7, p. 129
	CPLF-WS04B	710 J	330	7, p. 129
	CPLF-WS05B	4,800 J	330	7, p. 129
	CPLF-WS06B	600 J	330	7, p. 131
	CPLF-WS08A	1,800	330	7, p. 131
	CPLF-WS08B	660 J	330	7, p. 131
	ORLF-WS01B	900	330	7, p. 107
	ORLF-WS02B	1,200 J	330	7, p. 107
	ORLF-WS20A	380 J	330	7, p. 111
	ORLF-WS06B	650	330	7, p. 107
	ORLF-WS04B	640	330	7, p. 107
	ORLF-WS05B	1,100	330	7, p. 107
	ORLF-WS20B	1,900 J	330	7, p. 113
Benzo(g,h,i)perylene	CPLF-WS02B	1,000 J	330	7, p. 129
	CPLF-WS05B	2,400 J	330	7, p. 129
	CPLF-WS08A	790	330	7, p. 131
	CPLF-WS08B	400 J	330	7, p. 131
	ORLF-WS07B	860 J	330	7, p. 109
	ORLF-WS09B	1,200	330	7, p. 109
	ORLF-WS11B	430	330	7, p. 109
	ORLF-WS25B	940	330	7, p. 113
	ORLF-WS26B	14,000	330	7, p. 115

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(g,h,i)perylene (Continued)	ORLF-WS26A	2,400	330	7, p. 115
	ORLF-WS26C	33,000	33	7, p. 115
	ORLF-WS28B	2,600 J	33	7, p. 115
	ORLF-WS20B	540 J	330	7, p. 113
bis(2-Ethylhexyl)phthalate	ORLF-WS26B	4,700 J	330	7, p. 115
	ORLF-WS28B	3,300 J	330	7, p. 115
	ORLF-WS26B	4,700 J	330	7, p. 115
	CPLF-WS05B	49,000	330	7, p. 129
	CPLF-WS06B	6,800	330	7, p. 131
	CPLF-WS08B	12,000	330	7, p. 131
	CPLF-WS08D	2,200	330	7, p. 131
	ORLF-WS20B	10,000	330	7, p. 113
	ORLF-WS20A	1,100	330	7, p. 111
	ORLF-WS01B	1,500	330	7, p. 107
	ORLF-WS02B	4,500	330	7, p. 107
	ORLF-WS06B	5,600 +	330	7, p. 107
	ORLF-WS18B	33,000 J	330	7, p. 111
	ORLF-WS19B	82,000	330	7, p. 111
Butylbenzylphthalate	CPLF-WS06B	1,900 J	330	7, p. 131
	CPLF-WS08B	13,000	330	7, p. 131
	CPLF-WS08D	2,400	330	7, p. 131
	ORLF-WS20B	7,900	330	7, p. 113
Carbazole	ORLF-WS09B	670 J	330	7, p. 109
	ORLF-WS11B	880	330	7, p. 109
	ORLF-WS26B	19,000	330	7, p. 115
	ORLF-WS28B	2,800 J	330	7, p. 115
	CPLF-WS05B	1,400 J	330	7, p. 129
	CPLF-WS08B	1,300 J	330	7, p. 131
	ORLF-WS01B	350 J	330	7, p. 107
	ORLF-WS02B	750 J	330	7, p. 107
	ORLF-WS05B	400 J	330	7, p. 107
	ORLF-WS20B	4,700	330	7, p. 113

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Chrysene	ORLF-WS07B	1,900 J	330	7, p. 109
	ORLF-WS09B	3,000	330	7, p. 109
	ORLF-WS11B	3,900 +	330	7, p. 109
	ORLF-WS12B	2,000 J	330	7, p. 109
	ORLF-WS25B	3,000	330	7, p. 113
	ORLF-WS26B	59,000	330	7, p. 115
	ORLF-WS26A	4,600	330	7, p. 115
	ORLF-WS26C	120,000	330	7, p. 115
	ORLF-WS29B	810	330	7, p. 115
	ORLF-WS28B	10,000 J	330	7, p. 115
	CPLF-WS02C	740 J	330	7, p. 129
	CPLF-WS05B	6,400 J	330	7, p. 129
	CPLF-WS06B	730 J	330	7, p. 131
	CPLF-WS08A	2,000	330	7, p. 131
	CPLF-WS08B	1,000 J	330	7, p. 131
	ORLF-WS01B	1,100	330	7, p. 107
	ORLF-WS02B	1,900 J	330	7, p. 107
	ORLF-WS06B	720	330	7, p. 107
	ORLF-WS19B	5,400 J	330	7, p. 111
	ORLF-WS18B	4,800 J	330	7, p. 111
	ORLF-WS20B	3,300 J	330	7, p. 113
	ORLF-WS20A	380 J	330	7, p. 111
4,4-DDD	ORLF-WS18B	150 +	3.3	7, p. 118
4,4-DDT	ORLF-WS18B	360 J	3.3	7, p. 118
Dibenzofuran	ORLF-WS09B	410 J	330	7, p. 109
	ORLF-WS11B	700	330	7, p. 109
	ORLF-WS12B	530 J	330	7, p. 109
	ORLF-WS26B	22,000	330	7, p. 113
	ORLF-WS26C	14,000 J	330	7, p. 113
	ORLF-WS28B	1,700 J	330	7, p. 113
	CPLF-WS08B	760 J	330	7, p. 131
	CPLF-WS05B	1,600 J	330	7, p. 129

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Dibenzofuran (Continued)	ORLF-WS02B	740 J	330	7, p. 107
	ORLF-WS19B	9,500 J	330	7, p. 111
	ORLF-WS05B	410 J	330	7, p. 107
	ORLF-WS20B	9,000	330	7, p. 113
Dibenz(a,h)anthracene	CPLF-WS08A	380 J	330	7, p. 131
	ORLF-WS09B	530 J	330	7, p. 109
	ORLF-WS11B	500	330	7, p. 109
	ORLF-WS25B	540 J	330	7, p. 113
	ORLF-WS26B	8,800	330	7, p. 115
	ORLF-WS26A	760 J	330	7, p. 115
	ORLF-WS26C	20,000	330	7, p. 115
Di-n-butylphthalate	CPLF-WS08B	3,400	330	7, p. 131
	ORLF-WS10B	19,000 +	330	7, p. 109
Fluoranthene	ORLF-WS25B	5,100	330	7, p. 113
	ORLF-WS26B	160,000 +	330	7, p. 115
	ORLF-WS26A	8,900	330	7, p. 115
	ORLF-WS26C	340,000 +	330	7, p. 115
	ORLF-WS29B	1,500	330	7, p. 115
	ORLF-WS28B	37,000 +	330	7, p. 115
	CPLF-WS01B	1,700	330	7, p. 129
	CPLF-WS02B	4,400	330	7, p. 129
	CPLF-WS02C	900 J	330	7, p. 129
	CPLF-WS03B	2,500	330	7, p. 129
	CPLF-WS04B	1,300	330	7, p. 129
	CPLF-WS05B	15,000 J	330	7, p. 129
	CPLF-WS06B	1,600 J	330	7, p. 131
	CPLF-WS07B	420	330	7, p. 131
	CPLF-WS08A	3,000	330	7, p. 131
	CPLF-WS08B	3,700	330	7, p. 131
	CPLF-WS08D	610	330	7, p. 131
	ORLF-WS01B	2,500	330	7, p. 107
	ORLF-WS02B	4,800	330	7, p. 107
	ORLF-WS06B	1,300	330	7, p. 107
	ORLF-WS19B	11,000 J	330	7, p. 111

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Fluoranthene (Continued)	ORLF-WS04B	910	330	7, p. 107
	ORLF-WS05B	3,800	330	7, p. 107
	ORLF-WS20B	17,000	330	7, p. 113
	ORLF-WS20A	540 J	330	7, p. 111
Fluorene	ORLF-WS09B	560 J	330	7, p. 109
	ORLF-WS11B	1,200	330	7, p. 109
	ORLF-WS12B	860 J	330	7, p. 109
	ORLF-WS28B	4,100 J	330	7, p. 115
	CPLF-WS02B	490 J	330	7, p. 129
	CPLF-WS05B	4,500 J	330	7, p. 129
	CPLF-WS06B	370 J	330	7, p. 131
	CPLF-WS08B	1,400 J	330	7, p. 131
	ORLF-WS01B	580	330	7, p. 107
	ORLF-WS02B	1,300 J	330	7, p. 107
	ORLF-WS18B	10,000 J	330	7, p. 111
	ORLF-WS19B	14,000 J	330	7, p. 111
	ORLF-WS05B	780 J	330	7, p. 107
	ORLF-WS20B	14,000	330	7, p. 113
gamma-Chlordane	ORLF-WS09B	16 J	1.7	7, p. 117
	ORLF-WS11B	120 + J	1.7	7, p. 117
	ORLF-WS12B	33 + J	1.7	7, p. 117
	ORLF-WS26A	2.9 J	1.7	7, p. 120
	ORLF-WS26B	70 + J	1.7	7, p. 120
	ORLF-WS26C	51 J	1.7	7, p. 120
	ORLF-WS27B	11J	1.7	7, p. 120
	ORLF-WS28B	170 + J	1.7	7, p. 120
	ORLF-WS29B	4.0 J	1.7	7, p. 120
	CPLF-WS02B	14.0 J	1.7	7, p. 132
	CPLF-WS02C	4.4 J	1.7	7, p. 132
	CPLF-WS05B	34 J	1.7	7, p. 132
	CPLF-WS06B	11 J	1.7	7, p. 133
	CPLF-WS07B	25 J	1.7	7, p. 133
	CPLF-WS08A	12 J	1.7	7, p. 133
	CPLF-WS08B	100 + J	1.7	7, p. 133

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
gamma-Chlordane (Continued)	CPLF-WS08D	16 J	1.7	7, p. 133
	ORLF-WS01B	31 J	1.7	7, p. 116
	ORLF-WS03B	3.8	1.7	7, p. 116
	ORLF-WS04B	7.0 J	1.7	7, p. 116
	ORLF-WS10B	5.2 J	1.7	7, p. 117
	ORLF-WS19B	99 J	1.7	7, p. 118
	ORLF-WS20A	42 +	1.7	7, p. 118
Hexachlorocyclopentadiene	CPLF-WS08B	1,600 J	330	7, p. 130
Indeno (1,2,3-cd)-pyrene	ORLF-WS07B	880 J	330	7, p. 109
	ORLF-WS09B	1,200	330	7, p. 109
	ORLF-WS11B	950	330	7, p. 109
	ORLF-WS12B	620 J	330	7, p. 109
	ORLF-WS25B	1,100	330	7, p. 113
	ORLF-WS26B	17,000	330	7, p. 115
	ORLF-WS26A	2,300	330	7, p. 115
	ORLF-WS26C	39,000	330	7, p. 115
	ORLF-WS28B	4,500 J	330	7, p. 115
	CPLF-WS01B	370 J	330	7, p. 129
	CPLF-WS02B	1,000 J	330	7, p. 129
	CPLF-WS03B	370 J	330	7, p. 129
	CPLF-WS05B	2,500 J	330	7, p. 129
	CPLF-WS08A	790	330	7, p. 131
	ORLF-WS01B	380 J	330	7, p. 107
	ORLF-WS05B	480 J	330	7, p. 107
	ORLF-WS20B	560 J	330	7, p. 113
Naphthalene	ORLF-WS11B	670	330	7, p. 108
	ORLF-WS12B	1,400 J	330	7, p. 108
	CPLF-WS06B	410 J	330	7, p. 130
	CPLF-WS08B	2,700	330	7, p. 130
	CPLF-WS05B	1,100 J	330	7, p. 128
	ORLF-WS02B	2,100	330	7, p. 106
	ORLF-WS18B	74,000	330	7, p. 110
	ORLF-WS19B	93,000	330	7, p. 110
	ORLF-WS05B	1,300	330	7, p. 106

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Naphthalene (Continued)	ORLF-WS10B	12,000 +	330	7, p. 108
	ORLF-WS20B	9,100	330	7, p. 112
N-Nitrosodiphenylamine	ORLF-WS28B	1,700 J	330	7, p. 115
	ORLF-WS10B	810 J	330	7, p. 109
Phenanthrene	ORLF-WS07B	990 J	330	7, p. 109
	ORLF-WS09B	5,300	330	7, p. 109
	ORLF-WS11B	7,700 +	330	7, p. 109
	ORLF-WS12B	3,700 J	330	7, p. 109
	ORLF-WS25B	1,600	330	7, p. 113
	ORLF-WS26B	160,000 +	330	7, p. 115
	ORLF-WS26A	4,000	330	7, p. 115
	ORLF-WS26C	160,000 +	330	7, p. 115
	ORLF-WS29B	1,500	330	7, p. 115
	ORLF-WS28B	18,000 +	330	7, p. 115
	CPLF-WS01B	1,300	330	7, p. 129
	CPLF-WS02B	3,200 J	330	7, p. 129
	CPLF-WS03B	1,800	330	7, p. 129
	CPLF-WS06B	1,600 J	330	7, p. 131
	CPLF-WS08A	750	330	7, p. 131
	CPLF-WS08B	5,900	330	7, p. 131
	CPLF-WS08D	550	330	7, p. 131
	CPLF-WS05B	15,000	330	7, p. 129
	ORLF-WS01B	3,100	330	7, p. 107
	ORLF-WS02B	6,700	330	7, p. 107
	ORLF-WS19B	36,000	330	7, p. 111
	ORLF-WS05B	4,100	330	7, p. 107
	ORLF-WS10B	680 J	330	7, p. 109
	ORLF-WS20B	42,000 +	330	7, p. 113

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Pyrene	ORLF-WS09B	5,300	330	7, p. 109
	ORLF-WS11B	7,500 +	330	7, p. 109
	ORLF-WS12B	3,600 J	330	7, p. 109
	ORLF-WS25B	4,700	330	7, p. 113
	ORLF-WS26B	120,000 +	330	7, p. 115
	ORLF-WS26A	8,500	330	7, p. 115
	ORLF-WS26C	250,000 +	330	7, p. 115
	ORLF-WS29B	1,300	330	7, p. 115
	ORLF-WS28B	29,000 +J	330	7, p. 115
	CPLF-WS01B	1,500	330	7, p. 129
	CPLF-WS02B	3,900	330	7, p. 129
	CPLF-WS02C	1,000 J	330	7, p. 129
	CPLF-WS03B	1,600	330	7, p. 129
	CPLF-WS04B	1,100	330	7, p. 129
	CPLF-WS05B	13,000	330	7, p. 129
	CPLF-WS06B	1,400 J	330	7, p. 131
	CPLF-WS07B	410	330	7, p. 131
	CPLF-WS08A	2,500	330	7, p. 131
	CPLF-WS08B	2,800	330	7, p. 131
	CPLF-WS08D	480	330	7, p. 131
	ORLF-WS01B	2,100	330	7, p. 107
	ORLF-WS02B	3,900	330	7, p. 107
	ORLF-WS18B	8,600 J	330	7, p. 111
	ORLF-WS19B	10,000 J	330	7, p. 111
	ORLF-WS04B	820	330	7, p. 107
	ORLF-WS05B	2,900	330	7, p. 107
	ORLF-WS10B	540 J	330	7, p. 109
	ORLF-WS20B	13,000	330	7, p. 113
Aroclor-1232	CPLF-WS05B	15,000 +J	33	7, p. 132
	CPLF-WS06B	3,000 +J	33	7, p. 133
	ORLF-WS05B	440 J	33	7, p. 116
	ORLF-WS01B	3,300 +J	33	7, p. 116
Aroclor-1242	CPLF-WS08D	3,300 +J	33	7, p. 133

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Aroclor-1254	CPLF-WS05B	3,500 +J	33	7, p. 132
	CPLF-WS06B	500	33	7, p. 133
	CPLF-WS07B	470	33	7, p. 133
	CPLF-WS08A	330 J	33	7, p. 133
	CPLF-WS08B	2,900 J	33	7, p. 133
	ORLF-WS12B	600 J	33	7, p. 117
	ORLF-WS26B	1,500 J	33	7, p. 120
	ORLF-WS01B	2,700 +	33	7, p. 116
	ORLF-WS18B	2,800 +J	33	7, p. 118
	ORLF-WS05B	900 +	33	7, p. 116
	ORLF-WS10B	610 J	33	7, p. 117
Aroclor-1260	ORLF-WS11B	8,600 +J	33	7, p. 117
	CPLF-WS02B	1,500 + J	33	7, p. 132
	CPLF-WS04B	490	33	7, p. 132
	CPLF-WS02C	270	33	7, p. 132

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Antimony	CPLF-WS04B	[3.2] L	ND	12	7, pp. 12, 45, 87
	CPLF-WS02B	342 L	ND	12	7, pp. 12, 45, 87
	CPLF-WS03B	35.8 L	ND	12	7, pp. 12, 45, 87
	CPLF-WS06B	[12.4] L	ND	12	7, pp. 12, 46, 87
	ORLF-WS09B	122 L	ND	12	7, pp. 12, 38, 87
	ORLF-WS25B	419 L	ND	12	7, pp. 12, 41, 87
	ORLF-WS26C	37.5 J	ND	12	7, pp. 12, 41, 87
	ORLF-WS27B	64.7	ND	12	7, pp. 12, 41, 87
	ORLF-WS29B	67.3	ND	12	7, pp. 12, 41, 87
	ORLF-WS28B	185	ND	12	7, pp. 12, 41, 87
	ORLF-WS08B	326 L	ND	12	7, pp. 12, 38, 87
Arsenic	ORLF-WS09B	35.9 L	4.3 L	2	7, pp. 12, 38, 87
	ORLF-WS28B	23.6	4.3 L	2	7, pp. 12, 41, 87
	ORLF-WS08B	27.5 L	4.3 L	2	7, pp. 12, 38 , 87
	CPLF-WS08C	37.3 L	4.3 L	2	7, pp. 12, 46, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Barium	ORLF-WS07B	1,500	118	40	7, pp. 12, 37, 87
	ORLF-WS09B	1,300	118	40	7, pp. 12, 38, 87
	ORLF-WS25B	809	118	40	7, pp. 12, 41, 87
	ORLF-WS27B	1,260	118	40	7, pp. 12, 41, 87
	ORLF-WS29B	942	118	40	7, pp. 12, 41, 87
	ORLF-WS28B	354	118	40	7, pp. 12, 41, 87
	CPLF-WS02B	590	118	40	7, pp. 12, 45, 87
	CPLF-WS08C	417	118	40	7, pp. 12, 46, 87
	ORLF-WS06B	586	118	40	7, pp. 12, 37, 87
	ORLF-WS08B	1,030	118	40	7, pp. 12, 38, 87
	ORLF-WS18B	359	118	40	7, pp. 12, 39, 87
	ORLF-WS19B	2,650	118	40	7, pp.12, 39, 87
	ORLF-WS04B	2,330	118	40	7, pp.12, 37, 87
	ORLF-WS10B	4,870 +	118	40	7, pp.12, 38, 87
	ORLF-WS10C	417	118	40	7, pp.12, 38, 87
	ORLF-WS20B	1,060	118	40	7, pp.12, 40, 87
	ORLF-WS20A	488	118	40	7, pp.12, 40, 87
Cadmium	ORLF-WS07B	5.8	ND	1	7, pp. 12, 37, 87
	ORLF-WS09B	8.4	ND	1	7, pp. 12, 38, 87
	ORLF-WS11B	11.6 J	ND	1	7, pp. 12, 38, 87
	ORLF-WS27B	2.7	ND	1	7, pp. 12, 41, 87
	ORLF-WS29B	3.3	ND	1	7, pp. 12, 41, 87
	ORLF-WS28B	7.0	ND	1	7, pp. 12, 41, 87
	CPLF-WS02C	5.7 J	ND	1	7, pp. 12, 45, 87
	ORLF-WS01B	3.5	ND	1	7, pp.12, 37, 87
	ORLF-WS02B	3.5	ND	1	7, pp.12, 37, 87
	ORLF-WS06B	3.8	ND	1	7, pp. 12, 37, 87
	ORLF-WS08B	4.5	ND	1	7, pp. 12, 38, 87
	ORLF-WS18B	5.7 J	ND	1	7, pp. 12, 39, 87
	ORLF-WS19B	9.7 J	ND	1	7, pp. 12, 39, 87
	ORLF-WS04B	4.1	ND	1	7, pp. 12, 37, 87
	ORLF-WS05B	2.4	ND	1	7, pp. 12, 37, 87
	ORLF-WS10B	5.4 J	ND	1	7, pp. 12, 38, 87
	ORLF-WS10C	3.7 J	ND	1	7, pp. 12, 38, 87
	ORLF-WS20B	2.9 J	ND	1	7, pp. 12, 40, 87
	ORLF-WS20A	5.7	ND	1	7, pp. 12, 40, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Chromium	ORLF-WS01B	238 J	27	2	7, pp. 12, 40, 87
	ORLF-WS07B	158 L	27	2	7, pp. 12, 37, 87
	ORLF-WS09B	83.9 L	27	2	7, pp. 12, 38, 87
	ORLF-WS11B	165 K	27	2	7, pp. 12, 38, 87
	ORLF-WS12B	99.3 K	27	2	7, pp. 12, 38, 87
	ORLF-WS27B	85.7	27	2	7, pp. 12, 41, 87
	ORLF-WS26A	104	27	2	7, pp. 12, 41, 87
	ORLF-WS28B	284	27	2	7, pp. 12, 41, 87
	CPLF-WS01B	90.9	27	2	7, pp. 12, 45, 87
	CPLF-WS03B	84.1	27	2	7, pp. 12, 45, 87
	CPLF-WS05B	85.1 J	27	2	7, pp. 12, 45, 87
	CPLF-WS06B	210 J	27	2	7, pp. 12, 46, 87
	CPLF-WS07B	235 J	27	2	7, pp. 12, 46, 87
	CPLF-WS08A	193 J	27	2	7, pp. 12, 46, 87
	CPLF-WS08B	288 J	27	2	7, pp. 12, 46, 87
	CPLF-WS08C	925 J	27	2	7, pp. 12, 46 , 87
	CPLF-WS08D	483 L	27	2	7, pp. 12, 46, 87
	ORLF-WS02B	127 J	27	2	7, pp. 12, 37, 87
	ORLF-WS06B	104 L	27	2	7, pp. 12, 37, 87
	ORLF-WS08B	192 L	27	2	7, pp. 12, 38, 87
	ORLF-WS18B	262 K	27	2	7, pp. 12, 39, 87
	ORLF-WS19B	907 K	27	2	7, pp. 12, 39, 87
	ORLF-WS04B	180 L	27	2	7, pp. 12, 37, 87
	ORLF-WS05B	137 J	27	2	7, pp. 12, 37, 87
	ORLF-WS10B	82.1 K	27	2	7, pp. 12, 38, 87
	ORLF-WS10C	189 K	27	2	7, pp. 12, 38, 87
	ORLF-WS20B	139 K	27	2	7, pp. 12, 40, 87
	ORLF-WS20A	359	27	2	7, pp. 12, 40, 87
Copper	ORLF-WS07B	511 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS09B	481 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS09C	121 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS11B	218 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS12B	215 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS26B	248 J	33.7	5	7, pp. 12, 41, 87
	ORLF-WS26C	224 J	33.7	5	7, pp. 12, 41, 87
	ORLF-WS27B	612	33.7	5	7, pp. 12, 41, 87
	ORLF-WS29B	252	33.7	5	7, pp. 12, 41, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Copper (Continued)	ORLF-WS26A	253	33.7	5	7, pp. 12, 41, 87
	ORLF-WS28B	1,330	33.7	5	7, pp. 12, 41, 87
	CPLF-WS02B	205	33.7	5	7, pp. 12, 45, 87
	CPLF-WS03B	54.4	33.7	5	7, pp. 12, 45, 87
	CPLF-WS04B	249	33.7	5	7, pp. 12, 45, 87
	CPLF-WS08B	149 J	33.7	5	7, pp. 12, 46, 87
	CPLF-WS08C	304 J	33.7	5	7, pp. 12, 46, 87
	ORLF-WS01B	910 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS02B	6,060 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS06B	590 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS08B	843 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS18B	264 J	33.7	5	7, pp. 12, 39, 87
	ORLF-WS19B	1,390 J	33.7	5	7, pp. 12, 39, 87
	ORLF-WS04B	6,230 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS05B	164 J	33.7	5	7, pp. 12, 37, 87
	ORLF-WS10B	115 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS10C	699 J	33.7	5	7, pp. 12, 38, 87
	ORLF-WS20B	310 J	33.7	5	7, pp. 12, 40, 87
	ORLF-WS20A	349	33.7	5	7, pp. 12, 40, 87
Lead	ORLF-WS07B	1,920	101	0.6	7, pp. 12, 37, 87
	ORLF-WS09B	1,120	101	0.6	7, pp. 12, 38, 87
	ORLF-WS09C	603	101	0.6	7, pp. 12, 38, 87
	ORLF-WS11B	450	101	0.6	7, pp. 12, 38, 87
	ORLF-WS12B	548	101	0.6	7, pp. 12, 38, 87
	ORLF-WS26B	425	101	0.6	7, pp. 12, 41, 87
	ORLF-WS26C	303	101	0.6	7, pp. 12, 41, 87
	ORLF-WS27B	3,730	101	0.6	7, pp. 12, 41, 87
	ORLF-WS29B	3,260	101	0.6	7, pp. 12, 41, 87
	ORLF-WS26A	320	101	0.6	7, pp. 12, 41, 87
	ORLF-WS28B	2,020	101	0.6	7, pp. 12, 41, 87
	CPLF-WS02B	497	101	0.6	7, pp. 12, 45, 87
	CPLF-WS04B	273	101	0.6	7, pp. 12, 45, 87
	CPLF-WS05B	395	101	0.6	7, pp. 12, 45, 87
	CPLF-WS07B	509	101	0.6	7, pp. 12, 46, 87
	CPLF-WS08A	480	101	0.6	7, pp. 12, 46, 87
	CPLF-WS08B	437	101	0.6	7, pp. 12, 46, 87
	CPLF-WS08C	604	101	0.6	7, pp. 12, 46, 87
	ORLF-WS01B	482	101	0.6	7, pp. 12, 37, 87
	ORLF-WS06B	2,060	101	0.6	7, pp. 12, 37, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Lead (Continued)	ORLF-WS08B	2,430	101	0.6	7, pp. 12, 38, 87
	ORLF-WS18B	627	101	0.6	7, pp. 12, 39, 87
	ORLF-WS19B	2,760	101	0.6	7, pp. 12, 37, 87
	ORLF-WS04B	2,620	101	0.6	7, pp. 12, 37, 87
	ORLF-WS10B	324	101	0.6	7, pp. 12, 37, 87
	ORLF-WS10C	787	101	0.6	7, pp. 12, 38, 87
	ORLF-WS20A	1,040	101	0.6	7, pp. 12, 40, 87
	ORLF-WS20B	1,540	101	0.6	7, pp. 12, 40, 87
Manganese	ORLF-WS09B	4,350 L	487	3	7, pp. 12, 38, 87
	ORLF-WS09C	3,590 L	487	3	7, pp. 12, 38, 87
	CPLF-WS02B	799 J	487	3	7, pp. 12, 45, 87
	ORLF-WS08B	5,530 L	487	3	7, pp. 12, 38, 87
	ORLF-WS18B	6,050	487	3	7, pp. 12, 39, 87
Mercury	ORLF-WS07B	0.97 K	0.18	0.1	7, pp. 12, 37, 87
	ORLF-WS09B	1.2 K	0.18	0.1	7, pp. 12, 38, 87
	ORLF-WS12B	0.57	0.18	0.1	7, pp. 12, 38, 87
	ORLF-WS25B	1.6	0.18	0.1	7, pp. 12, 41, 87
	ORLF-WS26B	1.3	0.18	0.1	7, pp. 12, 41, 87
	ORLF-WS26C	0.54	0.18	0.1	7, pp. 12, 41, 87
	CPLF-WS05B	1.0	0.18	0.1	7, pp. 12, 45, 87
	ORLF-WS08B	2.4 K	0.18	0.1	7, pp. 12, 38, 87
	ORLF-WS18B	0.47	0.18	0.1	7, pp. 12, 39, 87
	ORLF-WS19B	0.75	0.18	0.1	7, pp. 12, 39, 87
	ORLF-WS04B	2.1 K	0.18	0.1	7, pp. 12, 37, 87
	ORLF-WS05B	0.64	0.18	0.1	7, pp. 12, 37, 87
	ORLF-WS10B	0.82	0.18	0.1	7, pp. 12, 38, 87
	ORLF-WS10C	0.74	0.18	0.1	7, pp. 12, 38, 87
	ORLF-WS20A	2.6	0.18	0.1	7, pp. 12, 40, 87
Nickel	ORLF-WS07B	55.2	16.3	8	7, pp. 12, 37, 87
	ORLF-WS09B	120	16.3	8	7, pp. 12, 38, 87
	ORLF-WS11B	64.3	16.3	8	7, pp. 12, 38, 87
	ORLF-WS12B	55.7	16.3	8	7, pp. 12, 38, 87
	ORLF-WS25B	94.9	16.3	8	7, pp. 12, 41, 87
	ORLF-WS26C	49.4	16.3	8	7, pp. 12, 41, 87
	ORLF-WS27B	49.5	16.3	8	7, pp. 12, 41, 87
	ORLF-WS28B	143	16.3	8	7, pp. 12, 41, 87
	CPLF-WS06B	75.6	16.3	8	7, pp. 12, 46, 87
	CPLF-WS07B	84.8	16.3	8	7, pp. 12, 46, 87
	CPLF-WS08A	77.7	16.3	8	7, pp. 12, 46, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Nickel (Continued)	CPLF-WS08B	166	16.3	8	7, pp. 12, 46, 87
	CPLF-WS08C	615	16.3	8	7, pp. 12, 46, 87
	CPLF-WS08D	261	16.3	8	7, pp. 12, 46, 87
	ORLF-WS01B	75.2	16.3	8	7, pp. 12, 37, 87
	ORLF-WS02B	72.0	16.3	8	7, pp. 12, 37, 87
	ORLF-WS06B	74.1	16.3	8	7, pp. 12, 37, 87
	ORLF-WS08B	104	16.3	8	7, pp. 12, 38, 87
	ORLF-WS18B	60.7	16.3	8	7, pp. 12, 39, 87
	ORLF-WS19B	186	16.3	8	7, pp. 12, 39, 87
	ORLF-WS04B	100	16.3	8	7, pp. 12, 37, 87
	ORLF-WS20B	211	16.3	8	7, pp. 12, 40, 87
	ORLF-WS20A	87.1	16.3	8	7, pp. 12, 40, 87
Silver	ORLF-WS07B	6.2	ND	2	7, pp. 12, 37, 87
	ORLF-WS09B	8.0	ND	2	7, pp. 12, 38, 87
	ORLF-WS11B	3.2	ND	2	7, pp. 12, 38, 87
	ORLF-WS15B	[2.2]	ND	2	7, pp. 12, 39, 87
	ORLF-WS26B	8.3	ND	2	7, pp. 12, 41, 87
	ORLF-WS26C	[3.0]	ND	2	7, pp. 12, 41, 87
	ORLF-WS28B	8.6	ND	2	7, pp. 12, 41, 87
	CPLF-WS05B	3.7 L	ND	2	7, pp. 12, 45, 87
	CPLF-WS06B	2.8 L	ND	2	7, pp. 12, 46, 87
	CPLF-WS08B	2.8 L	ND	2	7, pp. 12, 46, 87
	CPLF-WS08C	3.3	ND	2	7, pp. 12, 46, 87
	ORLF-WS01B	3.4 L	ND	2	7, pp. 12, 37, 87
	ORLF-WS02B	5.1 L	ND	2	7, pp. 12, 37, 87
	ORLF-WS06B	3.7	ND	2	7, pp. 12, 37, 87
	ORLF-WS08B	8.1	ND	2	7, pp. 12. 38, 87
	ORLF-WS18B	4.0	ND	2	7, pp. 12, 39, 87
	ORLF-WS19B	5.7	ND	2	7, pp. 12, 39, 87
	ORLF-WS04B	6.7	ND	2	7, pp. 12, 37, 87
	ORLF-WS10C	22.0	ND	2	7, pp. 12, 38, 87
	ORLF-WS20B	2.7	ND	2	7, pp. 12, 40, 87
	ORLF-WS20A	3.4	ND	2	7, pp. 12, 40, 87
Zinc	ORLF-WS07B	2,050 L	142	4	7, pp. 12, 37, 87
	ORLF-WS09B	1,930 L	142	4	7, pp. 12, 38, 87
	ORLF-WS09C	871 L	142	4	7, pp. 12, 38, 87
	ORLF-WS11B	644	142	4	7, pp. 12, 38, 87
	ORLF-WS26B	499	142	4	7, pp. 12, 41, 87
	ORLF-WS26C	1,080	142	4	7, pp. 12, 41, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Zinc (Continued)	ORLF-WS27B	1,380	142	4	7, pp. 12, 41, 87
	ORLF-WS29B	1,020	142	4	7, pp. 12, 41, 87
	ORLF-WS28B	2,080	142	4	7, pp. 12, 41, 87
	CPLF-WS08B	1,020	142	4	7, pp. 12, 46, 87
	CPLF-WS08C	505 L	142	4	7, pp. 12, 46, 87
	ORLF-WS01B	1,070	142	4	7, pp. 12, 37, 87
	ORLF-WS06B	2,320 L	142	4	7, pp. 12, 37, 87
	ORLF-WS08B	2,280 L	142	4	7, pp. 12, 38, 87
	ORLF-WS18B	489	142	4	7, pp. 12, 39, 87
	ORLF-WS19B	2,010	142	4	7, pp. 12, 39, 87
	ORLF-WS04B	2,690 L	142	4	7, pp. 12, 37, 87
	ORLF-WS10B	812	142	4	7, pp. 12, 38, 87
	ORLF-WS10C	887	142	4	7, pp. 12, 38, 87
	ORLF-WS20B	2,150	142	4	7, pp. 12, 40, 87
	ORLF-WS20A	768	142	4	7, pp. 12, 40, 87

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the quantitation or detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
\+ Results reported from diluted analysis
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

2.4.2 Hazardous Waste Quantity - Source 1

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 1.

Sum (pounds): Unknown

Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous wastestream quantity for Source 1.

Sum (pounds): Unknown
Hazardous Wastestream Quantity Value: NA

2.4.2.1.3 Volume

The information available is not sufficient to adequately evaluate the volume of Source 1.

Dimension of source (yd^3 or gallons): Unknown
Volume Assigned Value: 0

2.4.2.1.4 Area

According to aerial photograph interpretation, wastes were disposed of on approximately 54.5 acres; therefore, 54.5 acres (2,374,020 ft^2) was used to calculate the area of Source 1 (Ref. 6, pp. 12 through 17; Ref 23).

Area of Source (ft^2): 2,374,020
Area Assigned Value (Ref. 1, Table 2-5): 69.8

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 1 is assigned the value for the area of the landfill.

Source Hazardous Waste Quantity Value: 69.8

SOURCE DESCRIPTION

2.2 Source Characterization

Source Number: 2 - Horseshoe Landfill

Source Description: Landfill

Source Type: Landfill

Source 2 consists of approximately 14.8 acres of land located south of the B & O Railroad (now CSXT) tracks, south and west of 68th Street, and east of Moore's Run (Ref. 23) (Figure 2 which can be found in Appendix A). The State of Maryland Taxation and Assessment Map for the area shows that Source 2 is located within parcel 405 (Ref. 5, p. 1). Robb Tyler acquired parcel 405 sometime between August 1957 and March 31, 1960 (Ref. 5, p. 2; Ref. 8, p. 21). Robb Tyler was issued a total of six permits from the Maryland Department of Health to operate landfills on properties that currently make up the 68th Street Dump site. The available information indicates that Refuse Disposal Permit No. 65-33-0717, issued on July 6, 1965, corresponds to Source 2 (Ref. 8, pp. 20, 21, and 22; Ref. 28).

A review of the EPA aerial photographic analysis for the 68th Street Dump site reveals that from sometime prior to 1964 until at least 1973 wastes were deposited at Source 2 (Ref. 6, pp. 12 through 17; Ref. 81, p. 15). Three radio towers, not associated with the Robb Tyler operations, are located on a separate property within parcel 405 (Ref. 6, pp. 12 through 17; Ref. 9, p. 5; Ref. 5, pp. 1 and 6). Former waste haulers and employees of Robb Tyler identified Source 2 as an area where wastes were disposed of at the 68th Street Dump site (Ref. 10, pp. 19, 113, 165, 169, 175, 178 and 181)

Source Location:

Source 2 is located south and west of 68th Street and directly south of the B & O Railroad (now CSXT) tracks (Figure 2, which can be found in Appendix A). The source is in the shape of the letter "U" or a horseshoe. At the center of this source is a pond that is surrounded by wetland vegetation (Ref. 20; Ref. 81, Figure 8).

Containment:

Release to Ground Water: The ground water pathway was not scored.

Release via overland migration and/or flood: There is no evidence that a maintained engineered cover or functioning and maintained run-on control system and runoff management system was in place at Source 2. There is also no documentation that containment at the source was designed, constructed, operated, and maintained to prevent a washout of hazardous substances by a flood. For these reasons a containment factor value of 10 was assigned (Ref. 1, Tables 4-2 and 4-8).

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

2.4.1 Hazardous Substances - Source 2

Reportedly large amounts of industrial and commercial wastes were dumped by Robb Tyler in all of the source areas that comprise the 68th Street Dump site, including Source 2 (Ref. 8, pp. 1 and 2). Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of wastes was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156, and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that predominately covered all five source areas located at the site during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these wastestreams have been summarized in Table 1 in Appendix B. Wastes from most of these generators may have been disposed of at all five of the sources that comprise the site. Interviews of former waste haulers indicate that wastes were dumped at various areas of the site. Drivers were told where to dump their waste by the scale house operator or bulldoze operator after arrival at the dump (Ref. 10, pp.13, 14, 23, 24, 32, 44, 66, 113, 121, 124, 134 and 154). EPA's aerial photography analysis of wetland loss completed for the site supports the conclusion that from the late 1950s through 1968, the dumping of wastes was occurring into the wetlands of all five sources (Ref. 81, p. 15 and Figures 3 through 7).

In some cases, available information is sufficient to document that a particular wastestream was disposed of at a specific source. Evidence indicates that wastestreams generated by the following industries were disposed of at Source 2: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; Signode Steel; GAF Materials; Armco; Koppers; General Motors; Crown, Cork, & Seal; Bruning Paint Company; SCM (Glidden Durkee, Co.); and the Baltimore Sun. Hazardous substances associated with the wastestreams generated by these industries include trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

Further evidence of the hazardous substances disposed of at Source 2 is provided by analytical results from samples collected from this source on three occasions: (1) in 1986 a sample was collected at Source 2 as part of a site inspection (SI) of the 68th Street Dump site conducted by the EPA Region 3 Field Investigation Team (FIT); (2) in 1993, MDE collected a sample at Source 2 during an ESI; and (3) in 2000, the EPA Region 3 SATA team collected samples at Source 2.

EPA FIT Sample Results - 1986

As part of an SI completed in 1986, EPA Region 3 FIT collected one sample at Source 2. This sample was analyzed under the EPA CLP program for TCL organic and TAL inorganic compounds. Analytical results revealed a PCB concentration of 2,000 µg/kg in the sample collected from Source 2 (Ref. 11, pp. 6-2a and B-3).

MDE Sample Results - 1993

MDE collected one sample at Source 2 in 1993 during an ESI of the 68th Street Dump site (Ref. 9, p. 20). Analytical results for the sample are provided in the table below. All samples collected during this ESI were analyzed for TCL organic and TAL inorganic compounds, in accordance with EPA CLP protocols (Ref. 9, p. 18). Two samples, Soil-5 and Soil-6, were collected during the ESI to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). The background concentrations have been used to determine the significance of metals detected at Source 2. If a metal was detected in both background samples, the sample with the higher concentration was used as the comparative sample.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
Benzo(b)fluoranthene	Soil-15	2,000 J	330	9, p. 162
Dieldrin	Soil-15	960 J	3.3	9, p. 168

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Cadmium	Soil-15	10.8	ND	1	9, pp. 111, 113, 214, 231 and 232
Chromium	Soil-15	417	29.3 J	2	9, pp. 111, 113, 214, 231 and 232
Copper	Soil-15	798	25.8	5	9, pp. 111, 113, 214, 231 and 232
Lead	Soil-15	723	201 J	0.6	9, pp. 111, 113, 214, 231 and 232
Mercury	Soil-15	14.6	0.28	0.1	9, pp. 111, 113, 214, 231 and 232
Nickel	Soil-15	25.1	[6.1]	8	9, pp. 111, 113, 214, 231 and 232
Silver	Soil-15	47.3	ND	2	9, pp. 111, 113, 214, 231 and 232

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	CRDL (mg/kg)	Reference
Zinc	Soil-15	658	77.0	4	9, pp. 111, 113, 214, 231 and 232

Notes:
CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

EPA SATA Team Sample Results - 2000

In 2000, the EPA Region 3 SATA team conducted an ESI at the 68th Street Dump site and collected samples from Source 2 as part of the sampling event. Sampling locations are shown in Figure 2 in Appendix A. The samples were analyzed for organic and inorganic parameters using EPA CLP protocols. The samples analyzed for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples collected for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 2 during the sampling event. To identify metal concentrations exceeding background, the metal concentrations detected at Source 2 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
1,1'-Biphenyl	HSLF-WS15B	550 J	330	7, p. 95
2-Methylnaphthalene	HSLF-WS12B	180,000	330	7, p. 95
	HSLF-WS07B	2,400	330	7, p. 93
	HSLF-WS07C	3,000 J	330	7, p. 93
	HSLF-WS07D	7,400 J	330	7, p. 95
Acenaphthene	HSLF-WS03B	4,000 J	330	7, p. 93
	HSLF-WS15B	4,800	330	7, p. 95

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Anthracene	HSLF-WS03B	5,200 J	330	7, p. 94
	HSLF-WS15B	6,700	330	7, p. 96
Benzo(a)anthracene	HSLF-WS01A	830 J	330	7, p. 94
	HSLF-WS03A	810	330	7, p. 94
	HSLF-WS03B	8,000 J	330	7, p. 94
	HSLF-WS07B	640 J	330	7, p. 94
	HSLF-WS15B	12,000	330	7, p. 96
Benzo(b)fluoranthene	HSLF-WS01A	1,400	330	7, p. 94
	HSLF-WS03A	1,200	330	7, p. 94
	HSLF-WS03B	6,100 J	330	7, p. 94
	HSLF-WS15B	8,100	330	7, p. 96
Benzo(k)fluoranthene	HSLF-WS01A	1,200	330	7, p. 94
	HSLF-WS03A	1,000	330	7, p. 94
	HSLF-WS03B	5,500 J	330	7, p. 94
	HSLF-WS15B	9,700	330	7, p. 96
Benzo(a)pyrene	HSLF-WS01A	1,300	330	7, p. 94
	HSLF-WS03A	740 J	330	7, p. 94
	HSLF-WS03B	6,700 J	330	7, p. 94
	HSLF-WS07B	520 J	330	7, p. 94
	HSLF-WS15B	11,000	330	7, p. 96
Benzo(g,h,i)perylene	HSLF-WS01A	800 J	330	7, p. 94
	HSLF-WS03A	370 J	330	7, p. 94
	HSLF-WS03B	1,900 J	330	7, p. 94
	HSLF-WS15B	2,800 J	330	7, p. 96
Butylbenzylphthalate	HSLF-WS15B	4,400	330	7, p. 96
Carbazole	HSLF-WS03B	2,400 J	330	7, p. 94
Chrysene	HSLF-WS01A	1,700	330	7, p. 94
	HSLF-WS03A	1,200	330	7, p. 94
	HSLF-WS03B	8,000 J	330	7, p. 94
	HSLF-WS07B	660 J	330	7, p. 94
	HSLF-WS15B	12,000	330	7, p. 96
Dibenzofuran	HSLF-WS03B	3,000 J	330	7, p. 94
	HSLF-WS15B	3,800 J	330	7, p. 96

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Dibenz(a,h)anthracene	HSLF-WS01A	450 J	330	7, p. 94
	HSLF-WS15B	1,700 J	330	7, p. 96
2,4-Dimethylphenol	HSLF-WS12B	6,000 J	330	7, p. 95
Fluoranthene	HSLF-WS01A	820 J	330	7, p. 94
	HSLF-WS03A	1,300	330	7, p. 94
	HSLF-WS03B	17,000	330	7, p. 94
	HSLF-WS07B	1,000 J	330	7, p. 94
	HSLF-WS15B	19,000	330	7, p. 96
Fluorene	HSLF-WS15B	4,800	330	7, p. 96
gamma-chlordane	HSLF-WS07C	12 J	1.7	7, p. 97
	HSLF-WS03B	5.3 J	1.7	7, p. 97
	HSLF-WS03A	12 J	1.7	7, p. 97
	HSLF-WS02B	3.0 J	1.7	7, p. 97
	HSLF-WS01A	32	1.7	7, p. 97
Indeno(1,2,3-cd)-pyrene	HSLF-WS01A	1,200	330	7, p. 94
	HSLF-WS03A	650 J	330	7, p. 94
	HSLF-WS03B	3,500 J	330	7, p. 94
	HSLF-WS15B	3,800 J	330	7, p. 96
Phenanthrene	HSLF-WS01A	430 J	330	7, p. 94
	HSLF-WS03A	780 J	330	7, p. 94
	HSLF-WS03B	17,000	330	7, p. 94
	HSLF-WS07B	730 J	330	7, p. 94
	HSLF-WS15B	19,000	330	7, p. 96
Pyrene	HSLF-WS01A	800 J	330	7, p. 94
	HSLF-WS03A	1,100	330	7, p. 94
	HSLF-WS03B	15,000	330	7, p. 94
	HSLF-WS15B	17,000	330	7, p. 96
Aroclor-1242	HSLF-WS01A	530	33	7, p. 97
	HSLF-WS02B	110 J	33	7, p. 97
	HSLF-WS03B	490 J	33	7, p. 97
	HSLF-WS11B	290 J	33	7, p. 98
	HSLF-WS12B	160 J	33	7, p. 98
	HSLF-WS07B	260 J	33	7, p. 97
	HSLF-WS07C	1,300 +J	33	7, p. 97

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Aroclor-1242 (Continued)	HSLF-WS07D	110	33	7, p. 98
	HSLF-WS15B	1,800 J	33	7, p. 98
Aroclor-1254	HSLF-WS01A	290 J	33	7, p. 97
	HSLF-WS02B	89 J	33	7, p. 97
	HSLF-WS03A	74 J	33	7, p. 97
	HSLF-WS03B	160 J	33	7, p. 98
	HSLF-WS11B	200 J	33	7, p. 98
	HSLF-WS12B	110 J	33	7, p. 98
	HSLF-WS07B	210 J	33	7, p. 97
	HSLF-WS07C	520 J	33	7, p. 97
	HSLF-WS15B	1,200 J	33	7, p. 98

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Antimony	HSLF-WS09B	23.1 L	ND	12	7, pp. 12, 33, 87
Arsenic	HSLF-WS01A	64.1	4.3 L	2	7, pp. 12, 32, 87
	HSLF-WS03A	35.2	4.3 L	2	7, pp. 12, 32, 87
	HSLF-WS03B	76.6	4.3 L	2	7, pp. 12, 32, 87
	HSLF-WS07B	20.0	4.3 L	2	7, pp. 12, 32, 87
	HSLF-WS12B	21.8	4.3 L	2	7, pp. 12, 33, 87
	HSLF-WS15B	23.8	4.3 L	2	7, pp. 12, 33, 87
Barium	HSLF-WS01A	366	118.0	40	7, pp. 12, 32, 87
	HSLF-WS03A	523	118.0	40	7, pp. 12, 32, 87
	HSLF-WS03B	386	118.0	40	7, pp. 12, 32, 87
	HSLF-WS07B	448	118.0	40	7, pp. 12, 32, 87
	HSLF-WS11B	378	118.0	40	7, pp. 12, 33, 87
	HSLF-WS07C	582	118.0	40	7, pp. 12, 32, 87
	HSLF-WS09B	460	118.0	40	7, pp. 12, 33, 87
	HSLF-WS09C	397	118.0	40	7, pp. 12, 33, 87
Cadmium	HSLF-WS02B	92.1	ND	1	7, pp. 12, 32, 87
	HSLF-WS03B	13.8	ND	1	7, pp. 12, 32, 87
	HSLF-WS11B	19.9	ND	1	7, pp. 12, 33, 87
	HSLF-WS07C	74.9	ND	1	7, pp. 12, 32, 87
	HSLF-WS09B	9.4 J	ND	1	7, pp. 12, 33, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Cadmium (Continued)	HSLF-WS11A	7.2 J	ND	1	7, pp. 12, 33, 87
	HSLF-WS09C	203,000 +J	ND	1	7, pp. 12, 33, 87
Chromium	HSLF-WS07B	82.3 L	27	2	7, pp. 12, 32, 87
	HSLF-WS15B	112 L	27	2	7, pp. 12, 33, 87
	HSLF-WS07D	91.5	27	2	7, pp. 12, 32, 87
	HSLF-WS07C	175	27	2	7, pp. 12, 32, 87
Copper	HSLF-WS01A	152	33.7	5	7, pp. 12, 32, 87
	HSLF-WS02B	667	33.7	5	7, pp. 12, 32, 87
	HSLF-WS03B	129	33.7	5	7, pp. 12, 32, 87
	HSLF-WS07B	256	33.7	5	7, pp. 12, 32, 87
	HSLF-WS11B	331	33.7	5	7, pp. 12, 33, 87
	HSLF-WS09B	259	33.7	5	7, pp. 12, 33, 87
	HSLF-WS15B	454	33.7	5	7, pp. 12, 33, 87
	HSLF-WS07D	146	33.7	5	7, pp. 12, 32, 87
	HSLF-WS07C	266	33.7	5	7, pp. 12, 32, 87
	HSLF-WS11A	267	33.7	5	7, pp. 12, 33, 87
Lead	HSLF-WS01A	1,960 J	101	0.6	7, pp. 12, 32, 87
	HSLF-WS07B	3,740 J	101	0.6	7, pp. 12, 32, 87
	HSLF-WS11B	772 J	101	0.6	7, pp. 12, 33, 87
	HSLF-WS12B	2,860 J	101	0.6	7, pp. 12, 33, 87
	HSLF-WS09B	793	101	0.6	7, pp. 12, 33, 87
	HSLF-WS15B	2,770 J	101	0.6	7, pp. 12, 33, 87
	HSLF-WS07C	697	101	0.6	7, pp. 12, 32, 87
	HSLF-WS11A	844	101	0.6	7, pp. 12, 33, 87
	HSLF-WS09C	651	101	0.6	7, pp. 12, 33, 87
Mercury	HSLF-WS03B	4.5	0.18	0.1	7, pp. 12, 32, 87
Nickel	HSLF-WS01A	60.3	16.3	8	7, pp. 12, 32, 87
	HSLF-WS03B	104	16.3	8	7, pp. 12, 32, 87
	HSLF-WS07B	53.5	16.3	8	7, pp. 12, 32, 87
	HSLF-WS11B	84.5	16.3	8	7, pp. 12, 33, 87
	HSLF-WS15B	68.6	16.3	8	7, pp. 12, 33, 87
	HSLF-WS07D	78.1	16.3	8	7, pp. 12, 32, 87
	HSLF-WS07C	211	16.3	8	7, pp. 12, 32, 87
Silver	HSLF-WS01A	6.9 L	ND	2	7, pp. 12, 32, 87
	HSLF-WS11B	6.5 L	ND	2	7, pp. 12, 33, 87
	HSLF-WS09B	8.6 K	ND	2	7, pp. 12, 33, 87
	HSLF-WS07C	5.0	ND	2	7, pp. 12, 32, 87
	HSLF-WS11A	5.5 K	ND	2	7, pp. 12, 33, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Zinc	HSLF-WS01A	1,300	142	4	7, pp. 12, 32, 87
	HSLF-WS03B	10,800	142	4	7, pp. 12, 32, 87
	HSLF-WS07B	1,670	142	4	7, pp. 12, 32, 87
	HSLF-WS11B	1,680	142	4	7, pp. 12, 33, 87
	HSLF-WS15B	919	142	4	7, pp. 12, 33, 87
	HSLF-WS07C	3,160	142	4	7, pp. 12, 32, 87
	HSLF-WS09B	1,370	142	4	7, pp. 12, 33, 87
	HSLF-WS11A	1,050	142	4	7, pp. 12, 33, 87
	HSLF-WS09C	9,780	142	4	7, pp. 12, 33, 87

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
\+ Reported value result of diluted sample

2.4.2 Hazardous Waste Quantity - Source 2

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 2.

Sum (pounds): Unknown
Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous wastestream quantity for Source 2.

Sum (pounds): Unknown
Hazardous Wastestream Quantity Value: NA

2.4.2.1.3 Volume

The information available is not sufficient to adequately evaluate the volume of Source 2.

Dimension of source (yd^3 or gallons): Unknown
Volume Assigned Value: 0

2.4.2.1.4 Area

Based on a review of the aerial photograph dated June 1973, the horseshoe-shaped area used for waste disposal (Source 2) was approximately 15.7 acres or 683,892 ft^2 (Ref. 6, pp. 16 and 17; Ref. 23).

Area of Source (ft^2): 683,892
Area Assigned Value (Ref. 1, Table 2-5): 20.1

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 2 is assigned the value for the area of the landfill.

Source Hazardous Waste Quantity Value: 20.1

SOURCE DESCRIPTION

2.2 Source Characterization

Source Number: 3 - Island Landfill

Source Description: Landfill

Source Type: Landfill

Source 3 is an approximately 7-acre area where Robb Tyler began disposing of waste sometime in the late 1950s or early 1960s (Ref. 8, pp. 3 and 20; Ref. 9, p. 5). Source 3 is on the western half of an island located in Herring Run. The State of Maryland Taxation and Assessment Map for the area shows that Source 3 is located within parcel 151(Ref. 9, p. 5; Ref. 5, p. 1). Robb Tyler acquired parcel 151 in September 1954 (Ref. 5, p. 4). Robb Tyler was issued a total of six permits by the Maryland Department of Health to operate landfills on properties that he owned or leased. Available information indicates that Refuse Disposal Permit No. 60-34-0374, issued on May 24, 1960, corresponds to Source 3 (Ref. 8, p. 21; Ref. 28).

Waste disposal activities in the area of Source 3 are evident on aerial photographs taken from 1966 through 1973 (Ref. 12, pp. 22 through 29). Aerial photographs from 1938 document that the entire area of Source 3 was covered in estuarine emergent wetlands (E2EM) prior to landfilling (Ref. 81, p. 5 and Figure 3). Historical aerial photographs dated 1950, 1953, 1957, 1964, and 1968 document the filling in of these wetlands as landfilling of wastes progressed at Source 3. Eventually, a total of 5.9 acres of wetlands were lost due to landfilling (Ref. 81, p. 15).

MD WMA completed a reconnaissance of Source 3, the Island Landfill in February 1985. Numerous drums were observed on the island at this time (Ref. 8, p. 3). In July 1985, the Baltimore County Fire Department, MD WMA, and the EPA Region 3 TAT responded to a fire at Source 3. Air sample analysis revealed the presence of benzene; toluene; xylene; methyl chloride; and 1,1,1-trichloroethane. TAT personnel observed approximately 40 55-gallon drums at Source 3 (Ref. 9, p. 7; Ref. 11, p.4-1). MDE and EPA oversaw the removal of these 40 drums from Source 3 in 1985. In November 1985, the area the drums were removed from was covered with two feet of soil, capped with a sewage sludge/soil mixture and revegetated (Ref. 29, p. 2; Ref. 30, p. 5). According to MDE, only visible drums were removed in 1985, buried drums remain at the source (Ref. 31). According to persons present during the drum removal, the generator of the drums removed was General Motors. Further evidence that the drums originated from General Motors included "dashboard cut-outs" buried with the drums and undercoating materials (Ref. 84, p. 18). It was reported by a former employee that worked at the 68th Street Dump that for a period of ten years a truck would come to the 68th Street Site and "pour 18 to 24 55-gallon metal drums full of paint onto the level ground in the wetlands area of the site" (Ref. 10, p. 4).

Source Location:

Source 3 is on the western half of an island within Herring Run (see Figure 3 in Appendix A).

Containment:

Release to Ground Water: The ground water pathway was not scored.

Release via overland migration and/or flood: There is no evidence that a maintained engineered cover or functioning and maintained run-on control system and runoff management system was in place at Source 3. There is also no documentation that containment at the source was designed, constructed, operated, and maintained to prevent a washout of hazardous substances by a flood. For these reasons a containment factor value of 10 was assigned (Ref. 1, Tables 4-2 and 4-8).

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

2.4.1 Hazardous Substances - Source 3

A large number of drums were discovered at Source 3 in February 1985 (Ref. 8, p.3). Robb Tyler testified that drummed liquid wastes were disposed of at the 68th Street Dump site (Ref. 84, p. 75). Observations recorded during the emergency drum removal that occurred at Source 3 in 1985 provides evidence that some of the drums discovered at Source 3 contained wastes generated by General Motors (Ref. 84, p. 18). The wastestream generated by General Motors and known to have been disposed of by Robb Tyler consisted of 55-gallon drums of industrial wastewater treatment sludge; incinerator ash; paint sludge; solvents; waste oils; and styrofoam (Ref. 84, pp. 10 through 18) (Table 1, which can be found in Appendix B).

Additional documentation of the disposal of hazardous substances at Source 3 is provided by the analytical results for samples collected from the drums found at the source. As part of an emergency response in 1985, the MD WMA and EPA Region 3 TAT collected samples from these drums. In addition to these analytical results, further evidence of hazardous substance deposition at Source 3 is provided by analytical results of the ESI completed at the site in 2000 by the EPA Region 3 SATA team.

MD WMA Sample Results - 1985

In 1985, MD WMA collected samples from four drums embedded in the ground at Source 3. The samples were analyzed for total metals, purgeable halocarbons (using EPA Method 601) and purgeable aromatics (using EPA Method 602) (Ref. 8, pp. 3, 59, and 112 through 124). The table below summarizes the analytical results from the sampling event.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Toluene	IE 002A	200	8, p. 114
	IE 004A	2,800,000	8, p. 120
Ethylbenzene	IE 002A	310	8, p. 114
	IE 004A	16,780,000	8, p. 120
Xylenes	IE 002A	270	8, p. 114
	IE 004A	92,270,000	8, p. 120
Total Purgeable Halocarbons	IE 002A	4,000	8, p. 114
Hazardous Substance	**Evidence**	**Concentration (mg/kg)**	**Reference**
Metals			
Arsenic	IE 001B	7.46	8, p. 112
	IE 005B	21.9	8, p. 124
Cadmium	IE 001B	0.89	8, p. 112
	IE 002B	89.8	8, p. 115
	IE 005B	6.03	8, p. 124
Chromium	IE 001B	48.3	8, p. 112
	IE 002B	1,855	8, p. 115
	IE 005B	217	8, p. 124

Hazardous Substance	Evidence	Concentration (mg/kg)	Reference
Lead	IE 002B	8,105	8, p. 115
Copper	IE 005B	97.3	8, p.124
Nickel	IE 001B	2,759	8, p. 112
	IE 002B	781	8, p. 115
	IE 004B	24.7	8, p. 121
Zinc	IE 001B	51,232	8, p. 112
	IE 002B	817	8, p. 115
	IE 003B	245	8, p. 118

Notes:

mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

<u>EPA TAT Sample Results - 1985</u>

Samples of material found in drums located at Source 3 were also collected by EPA Region 3 TAT during an emergency response that occurred at Source 3 in July 1985. The samples were analyzed for VOCs. The table below summarizes the analytical results from the samples collected.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Acetone	Station #1	3,100 J	21, p. 1
	Station #4	7,700	21, p. 4
	Station #6	33,000	21, p. 7
Benzene	Station # 2	68,000	21, p. 2
	Station #6	26,000	21, p. 7
2-Butanone	Station #5	3,100	21, p. 5
	Station #6	6,000	21, p. 7
1,1-Dichloroethane	Station #2	1,400 J	21, p. 2
Toluene	Station # 1	90,000	21, p. 1
	Station #2	>1,400,000	21, p. 2
	Station #4	41,000	21, p. 4

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
1,1,1-Trichloroethane	Station #4	8,700	21, p. 4
	Station #5	1,600	21, p. 5
	Station #6	13,000	21, p. 7
1,1,1-Trichloroethene	Station #2	10,000	21, p. 2
Trichloroethylene	Station #2	730 J	21, p. 2
Ethylbenzene	Station # 2	>6,000,000	21, p. 2
	Station #3	1,300	21, p. 3
	Station #4	15,000	21, p. 4
	Station #5	2,800	21, p. 5
Xylenes	Station #1	150,000	21, p. 1
	Station #3	6,800	21, p. 3
	Station #4	80,000	21, p. 4
	Station #5	14,000	21, p. 5
	Station #6	18,000	21, p. 7

Notes:

mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

<u>EPA SATA Team Sample Results - 2000</u>

Samples were collected from Source 3 as part of the ESI conducted in 2000 by the EPA Region 3 SATA team. The sampling locations are shown in Figure 3 in Appendix A. These samples were analyzed for organic and inorganic parameters using CLP protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples collected for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 3 during the sampling event. To identify metal concentrations above background levels, the metal concentrations detected at Source 3 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
Benzo(a)anthracene	ILFB-01	530 J	330	7, p. 170
	ILFB-02	490 J	330	7, p. 170
	ILFWS-01B	660 J	330	7, p. 170
Benzo(b)fluoranthene	ILFB-01	540 J	330	7, p. 170
	ILFB-02	500 J	330	7, p. 170
	ILFWS-02B	730 J	330	7, p. 170
Benzo(k)fluoranthene	ILFB-01	670 J	330	7, p. 170
	ILFB-02	480 J	330	7, p. 170
	ILFWS-01B	810 J	330	7, p. 170
Benzo(a)pyrene	ILFB-01	540 J	330	7, p. 170
	ILFB-02	480 J	330	7, p. 170
	ILFWS-02B	760 J	330	7, p. 170
Benzo(g,h,i)perylene	ILFB-01	410 J	330	7, p. 170
	ILFB-02	330 J	330	7, p. 170
	ILFWS-02B	440 J	330	7, p. 170
Chrysene	ILFB-01	600 J	330	7, p. 170
	ILFB-02	600 J	330	7, p. 170
	ILFWS-01B	780 J	330	7, p. 170
Fluoranthene	ILFB-01	940 J	330	7, p. 170
	ILFB-02	990 J	330	7, p. 170
	ILFWS-01B	900 J	330	7, p. 170
Indeno(1,2,3-cd)-pyrene	ILFWS-02B	390 J	330	7, p. 170
	ILFB-01	330 J	330	7, p. 170
Phenanthrene	ILFB-01	660 J	330	7, p. 170
	ILFB-02	450 J	330	7, p. 170
	ILFWS-01B	710 J	330	7, p. 130
Pyrene	ILFB-01	690 J	330	7, p. 170
	ILFB-02	830 J	330	7, p. 170
	ILFWS-01B	690 J	330	7, p. 170

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Barium	ILFB-01	425	118.0	40	7, pp. 12, 62, 87
Cadmium	ILFB-01	5.7	ND	1	7, pp. 12, 62, 87
Chromium	ILFB-01	134	27	2	7, pp. 12, 62, 87
	ILFB-02	288	27	2	7, pp. 12, 62, 87
Copper	ILFB-01	268 J	33.7	5	7, pp. 12, 62, 87
	ILFB-02	117 J	33.7	5	7, pp. 12, 62, 87
Lead	ILFB-01	955	101	0.6	7, pp. 12, 62, 87
	ILFB-02	925	101	0.6	7, pp. 12, 62, 87
Mercury	ILFB-01	0.91	ND	0.2	7, pp. 12, 62, 87
	ILFB-02	0.46	ND	0.2	7, pp. 12, 62, 87
Nickel	ILFB-01	59	16.3	8	7, pp. 12, 62, 87
	ILFB-02	112	16.3	8	7, pp. 12, 62, 87
Zinc	ILFB-01	1,400	142	4	7, pp. 12, 62, 87
	ILFB-02	437	142	4	7, pp. 12, 62, 87

Notes:
- CRDL Contract-required detection limit
- CRQL Contract-required quantitation limit
- ND Not detected above the detection limit
- mg/kg Milligrams per kilogram
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise

2.4.2 Hazardous Waste Quantity - Source 3

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 3.

Sum (pounds): Unknown
Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous wastestream quantity for Source 3.

Sum (pounds): Unknown
Hazardous Wastestream Quantity Value: NA

2.4.2.1.3 Volume

The information available is not sufficient to adequately evaluate the volume of Source 3.

Dimension of source (yd^3 or gallons): Unknown
Volume Assigned Value: 0

2.4.2.1.4 Area

According to aerial photograph interpretation, 5.9 acres of wetlands were filled-in with waste; therefore, 5.9 acres (257,004 ft^2) was used to calculate the area of Source 3 (Ref. 81, pp. 15 and Figure 7; Ref. 23).

Area of Source (ft^2): 257,004
Area Assigned Value (Ref. 1, Table 2-5): 7.56

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 3 is assigned the value for the area of the landfill.

Source Hazardous Waste Quantity Value: 7.56

SOURCE DESCRIPTION

2.2 Source Characterization

Source Number: 4 - Redhouse Run Landfill

Source Description: Landfill

Source Type: Landfill

Source 4 consists of a dumping area used by Robb Tyler which is located west of Redhouse Run in the northeastern area of the 68th Street Dump site . The State of Maryland Taxation and Assessment Map indicates that Source 4 is located within parcel 403 and parcel 405 (Ref. 5, p. 1; Ref. 9, p. 5). Chesaco Park Holding Co., Inc. (with Robb Tyler as Vice President) acquired parcels 403 and 405 in 1957 (Ref. 5, pp. 5, 7, and 8). Robb Tyler was issued a total of six permits from the Maryland Department of Health to operate landfills on properties that he owned or leased. Available information indicates that permit no. 24, issued on January 16, 1957 corresponds to Source 4 (Ref. 8, p. 20; Ref. 28). In addition to dumping waste at this location, operations conducted by Robb Tyler in the area surrounding Source 4 included waste separation and salvaging, as well as spreading of uncooled incinerator ash (Ref. 9, p. 5; Ref. 13, pp. 4-1 and Appendix B, Figure 2).

Aerial photographs taken in 1964 reveal a dumping area on the western bank of Redhouse Run (Ref. 6, pp. 12 and 13). This fill continues to be visible on the 1968 aerial photograph (Ref. 6, pp. 14 and 15). The aerial photograph taken in 1973 shows additional fill dumped in this area, as well as miscellaneous debris. Analysis of this aerial photograph indicates that runoff leaving this area would drain into Redhouse Run (Ref. 6, pp. 16 and 17). Aerial photography from 1938 document that prior to filling the entire area of Source 4 was covered with PSS/FO wetlands located adjacent to Redhouse Run (Ref. 81, Figure 3). The filling of these wetlands occurred from at least 1964 through at least 1968 resulting in a total loss of 4.5 acres of wetlands (Ref. 81, pp. 13 and 15).

In 1971, Browning-Ferris Industries (BFI) a refuse collection business, began leasing from Robb Tyler, the property where Source 4 is located. In 1972, BFI purchased the Tyler waste disposal business (Ref. 9, p. 14; Ref. 34).

The EPA Region 3 FIT conducted an SI at Source 4 in 1984. Numerous areas of possible soil contamination were observed and sampled (Ref. 13, Appendix B, Figure 3; Ref. 14, pp. 8, 14 through 16). The areas of soil contamination may be the result of both Robb Tyler's and BFI's waste handling activities conducted in this area (Ref. 36; Ref. 37).

Source Location:

Source 4 is located along the western bank of Redhouse Run east of 68th Street (see Figure 3 in Appendix A).

Containment:

Release to Ground Water: The ground water pathway was not scored.

Release via overland migration and/or flood: There is no evidence that a maintained engineered cover or functioning and maintained run-on control system and runoff management system was in place at Source 4. There is also no documentation that containment at the source was designed, constructed, operated, and maintained to prevent a washout of hazardous substances by a flood. For these reasons a containment factor value of 10 was assigned (Ref. 1, Tables 4-2 and 4-8).

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

2.4.1 Hazardous Substances- Source 4

During a photographic survey conducted by MD WMA on June 22, 1984, three 55-gallon drums were observed protruding from the ground at Source 4 (Ref. 32; Ref. 33). After the discovery of the drums MD WMA returned to Source 4 on June 28, 1984 to complete an investigation of the area. At this time it was determined that one of the estimated ten drums found at the source was full. Analytical results from a sample of the drum contents determined that the full drum contained paint sludge (Ref. 32). Robb Tyler's son, Alfred Tyler, the owner of the property at the time, secured the removal of 10 drums from Source 4 in July 1984 (Ref. 8, p. 2; Ref. 9, p. 5; Ref. 32; Ref. 33; Ref. 35). Additional evidence that hazardous wastes were disposed of at Source 4 is provided in testimony given to EPA investigators from a former employee of the Koppers Company. He stated that he helped dispose of 55-gallon drums of liquid solvent generated from the Koppers Company onto the ground in the area of Source 4 (Ref. 10, pp. 119, 120 and 122a). Also, the testimony of a former Robb Tyler truck driver indicates that wastes generated by General Motors were disposed of at Source 4. During his testimony, the former driver stated that he normally disposed of wastes from General Motors in a pit at Source 5; however he recalled that at one time when this area was closed the waste was dumped "over at Rob Tyler's office" (Ref. 83, pp. 85 and 86). Robb Tyler's office was located near Source 4 (Ref. 10, pp.108 and 166). The wastestream generated by General Motors and known to have been disposed of by Robb Tyler consisted of 55-gallon drums of industrial wastewater treatment sludge; incinerator ash; paint sludge; solvents; waste oils; and styrofoam (Ref. 84, pp. 10 through 18) (Table 1, which can be found in Appendix B).

Wastes were encountered at Source 4 by MDE personnel in 1994 during collection of soil samples. Types of wastes encountered included fly ash and material with a strong oily odor, possibly associated with roofing waste (Ref. 60, p. 9). Trash, oily smells, and ash were also encountered at Source 4 during the test pit excavations conducted in 2000 (Ref. 82, Logbook 1, p. 42). Testimonies of former waste haulers document that fly ash from Baltimore Gas and Electric was deposited at all five sources that comprise the 68th Street Dump site (Ref. 10, pp. 7, 14, 17, 25, 27, 32, 33, 42, 44, 49, 58, 94, 96, 113, 114, 118a, 118b, 126, 130, 132, 145, 146, 149, 156, 161, 162, 164, 165 166).

Additional evidence of the presence of hazardous substances at Source 4 is documented by the results of four sampling events. Samples were collected from Source 4 in 1986 by the EPA Region 3 FIT, in 1993 and 1994 by MDE, and in 2000 by the EPA Region 3 SATA team. The tables below present the analytical results from each of these sampling events.

EPA FIT Sample Results - 1986

The EPA Region 3 FIT collected four samples from Source 4 during an SI conducted in 1986. Soil sample C9223/MC4964 was collected from soils where drums were removed in 1984, soil sample C9249/MC4962 was collected from a pile of fly ash (generated from the City of Baltimore incinerator) located northwest of the former Robb Tyler office building, sample C9248/MC4950 was collected from soils determined by BFI to exhibit the characteristic of reactivity, and C9250/MC4963 was collected from a drainage ditch that intersects Herring Run (Ref. 13, pp. Section 6 and Figure 3; Ref.14, pp. 2, 8, 14, 15, and 16). The samples collected during the SI were analyzed for organic and inorganic parameters by an EPA CLP laboratory. The analytical results for these samples are shown in the table below. No background samples were collected during the SI; therefore, the metal concentrations detected in the samples have been compared to the concentrations in the background sample collected by the EPA Region 3 SATA team during the ESI completed in 2000.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
Bis(2-ethylhexyl) phthalate	C9223	611,129 J	330	13, p. 6-5
	C9249	7,656 J	330	13, p. 6-5
	C9250	10,388 J	330	13, p. 6-5
Pyrene	C9223	9,140 J	330	13, p. 6-5
	C9250	4,427 K	330	13, p. 6-5
Phenanthrene	C9250	2,938 J	330	13, p. 6-5
Chrysene	C9250	3,166 J	330	13, p. 6-5
Fluoranthene	C9223	1,644 K	330	13, p. 6-5

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Aluminum	MC4962	31,250	8,800	200	13, p. 6-6; 7, pp. 12 and 87
Arsenic	MC4950	13	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	45	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4964	26	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
Cadmium	MC4950	6.7	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4963	1.45	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	38	ND	1	13, p. 6-6; 7, pp. 12 and 87
Chromium	MC4950	260	27	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	280	27	2	13, p. 6-6; 7, pp. 12 and 87
Copper	MC4950	338	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4962	4,490	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4964	690	33.7	5	13, p. 6-6; 7, pp. 12 and 87
Lead	MC4950	622	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4962	2,850	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4964	1,960	101	0.6	13, p. 6-6; 7, pp. 12 and 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Mercury	MC4950	3.2	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	0.8	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
Nickel	MC4962	1,100	16.3	8	13, p. 6-7; 7, pp. 12 and 87
	MC4964	64	16.3	8	13, p. 6-7; 7, pp. 12 and 87
Zinc	MC4950	790	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4962	23,900	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4964	1,760	142	4	13, p. 6-7; 7, pp. 12 and 87

Notes:
CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low

MDE Sample Results - 1993

MDE collected one composite soil sample from Source 4 during the ESI conducted in 1993. This sample was analyzed for TCL organic and TAL inorganic compounds in accordance with EPA CLP protocols (Ref. 9, p. 18). Two samples, Soil-5 and Soil-6, were collected during the ESI to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of metals detected at Source 4. If a metal was detected in both background samples, the sample with the higher concentration was used as the comparative sample. The analytical results for the sample collected at Source 4 are provided in the table below.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
2-Methylnaphthalene	Soil-11	710 J	330	9, pp. 158 and 312
Anthracene	Soil-11	4,000	330	9, pp. 159 and 313
Benzo(a)anthracene	Soil-11	11,000 J	330	9, pp. 159 and 313
Benzo(b)fluoranthene	Soil-11	20,000 J+	330	9, pp. 159 and 315
Benzo(a)pyrene	Soil-11	8,800 J	330	9, pp. 159 and 313
Benzo(g,h,i)perylene	Soil-11	3,800 J	330	9, pp. 159 and 313
Bis(2-ethylhexyl)phthalate	Soil-11	72,000 +	330	9, pp. 159 and 315
Carbazole	Soil-11	2,600	330	9, pp. 159 and 313
Chrysene	Soil-11	8,500 J	330	9, pp. 159 and 313

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Chlordane (alpha)	Soil-11	58J	1.7	9, pp. 167 and 362
Chlordane (gamma)	Soil-11	21 J	1.7	9, pp. 167 and 362
Dibenzofuran	Soil-11	1,200 J	330	9, pp. 158 and 362
Dibenz(a,h)anthracene	Soil-11	1,500 J	330	9, pp. 159 and 313
Fluoranthene	Soil-11	20,000 +	330	9, pp. 159 and 315
Fluorene	Soil-11	1,900 J	330	9, pp. 158 and 313
Indeno(1,2,3-cd)-pyrene	Soil-11	4,200 J	330	9, pp. 159 and 313
Naphthalene	Soil-11	1,200 J	330	9, pp. 157 and 312
Phenanthrene	Soil-11	14,000 +	330	9, pp. 159 and 315
Pyrene	Soil-11	13,000 J	330	9, pp. 159 and 313
Aroclor-1260	Soil-11	750 J	33	9, pp. 167 and 362

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Arsenic	Soil-11	33.8 L	3.9 L	2	9, pp. 110, 113, 211, 231 and 232
Cadmium	Soil-11	6.3	ND	1	9, pp. 110, 113, 211, 231 and 232
Copper	Soil-11	467	25.8	5	9, pp. 110, 113, 211, 231 and 232
Lead	Soil-11	1,530	201 J	0.6	9, pp. 110, 113, 211, 231 and 232
Mercury	Soil-11	0.85	0.28	0.1	9, pp. 110, 113, 211, 231 and 232
Nickel	Soil-11	224	ND	8	9, pp. 110, 113, 211, 231 and 232
Silver	Soil-11	17.5	ND	2	9, pp. 110, 113, 211, 231 and 232
Zinc	Soil-11	1,520	77.0	4	9, pp. 110, 113, 211, 231 and 232

Notes:
- CRDL Contract-required detection limit
- CRQL Contract-required quantitation limit
- ND Not detected above the detection limit
- mg/kg Milligrams per kilogram
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise
- L Analyte present; reported value may be biased low
- [ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
- \+ Results taken from diluted sample

MDE Sample Results - 1994

MDE returned to Source 4 in 1994 to collect soil samples from 3 locations(Ref. 60, p. 2). The samples were analyzed in accordance with EPA CLP protocols for TCL organic and TAL inorganic parameters (Ref. 60, pp. 8 and 9; Ref. 61).

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
1,2,4-Trimethylbenzene	S-5	475	5	61, p. 19
Naphthalene	S-5	281,000	330	61, p. 19
Benzo(b)fluoranthene	S-1	5,000 J	330	61, p. 17
	S-2	15,000	330	61, p. 17
Benzo(a)anthracene	S-1	3,700	330	61, p. 17
	S-2	8,300	330	61, p. 17
	S-5	90,000 J	330	61, p. 17
Benzo(a)pyrene	S-1	3,000	330	61, p. 17
	S-2	7,500	330	61, p. 17
	S-5	55,000 J	330	61, p. 17
Benzo(g,h,i)perylene	S-1	2,700	330	61, p. 17
	S-2	6,000	330	61, p. 17
	S-5	42,000	330	61, p. 17
Benzo(k)fluoranthene	S-5	95,000 J	330	61, p. 17
Bis(2-ethyhexyl)phthalate	S-4	560	330	61, p. 17
	S-5	45,000	330	61, p. 17
Buthylbenzylphthalate	S-2	22,000	330	61, p. 17
Carbazole	S-4	770	330	61, p. 17
	S-5	82,000 J	330	61, p. 17
Chrysene	S-1	3,300	330	61, p. 17
	S-2	8,200	330	61, p. 17
	S-5	> 4,000 J	330	61, p. 17
Dibenzofuran	S-4	500	330	61, p. 17
	S-5	76,000 J	330	61, p. 17
Fluoranthene	S-1	6,000 J	330	61, p. 17
	S-2	17,000	330	61, p. 17
	S-5	80,000 J	330	61, p. 17
Fluorene	S-5	70,000 J	330	61, p. 17
	S-4	1,200	330	61, p. 17

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Indeno(1,2,3-cd)pyrene	S-2	7,400	330	61, p. 17
	S-5	55,000 J	330	61, p. 17
2-methylnaphthalene	S-5	132,000 J	330	61, p. 17
Aroclor-1260	S-1	421	160	61, p. 18
	S-2	564	160	61, p. 18

Notes:

CRQL Contract-required quantitation limit

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

EPA SATA Team Sample Results - 2000

The EPA Region 3 SATA team collected samples from Source 4 as part of the ESI conducted in 2000. Sampling locations are shown in Figure 3 in Appendix A. The samples were analyzed for organic and inorganic parameters using CLP protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples collected for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 4 during the sampling event. To identify metal concentrations above background levels, the metal concentrations detected at Source 4 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (μg/kg)	CRQL (μg/kg)	Reference
Organics				
2,4-Dimethylphenol	BLFWS-03B	690 J	330	7, p. 165
2-Methylnaphthalene	BLFWS-01B	480 J	330	7, p. 165
	BLFWS-02B	630	330	7, p. 165
4-Methylphenol	BLFWS-03B	1,900 J	330	7, p. 165
Acenaphthene	BLF-SS02	360 J	330	7, p. 165
Anthracene	BLFWS-03B	580 J	330	7, p. 166
	BLF-SS02	1,200 J	330	7, p. 166
Benzo(a)anthracene	BLFWS-01B	580 J	330	7, p. 166
	BLFWS-03B	1,800 J	330	7, p. 166
	BLF-SS01	360 J	330	7, p. 166
	BLF-SS02	4,400	330	7, p. 166
Benzo(b)fluoranthene	BLFWS-01B	500 J	330	7, p. 166
	BLFWS-03B	1,500 J	330	7, p. 166
	BLF-SS01	450 J	330	7, p. 166
	BLF-SS02	6,000	330	7, p. 166
Benzo(k)fluoranthene	BLFWS-01B	500 J	330	7, p. 166
	BLFWS-03B	1,500 J	330	7, p. 166
	BLF-SS01	410 J	330	7, p. 166
	BLF-SS02	3,200 J	330	7, p. 166
Benzo(a)pyrene	BLFWS-01B	660 J	330	7, p. 166
	BLFWS-03B	1,700 J	330	7, p. 166
	BLF-SS01	520 J	330	7, p. 166
	BLF-SS02	5,000	330	7, p. 166

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(g,h,i)perylene	BLFWS-03B	630 J	330	7, p. 166
	BLF-SS01	720 J	330	7, p. 166
	BLF-SS02	2,000	330	7, p. 166
bis(2-Ethylhexyl)phthalate	BLFWS-01B	47,000	330	7, p. 166
	BLFWS-02B	30,000	330	7, p. 166
	BLF-SS01	4,900	330	7, p. 166
	BLF-SS02	6,900	330	7, p. 166
Butylbenzylphthalate	BLFWS-03B	1,300 J	330	7, p. 166
	BLF-SS02	770 J	330	7, p. 166
Chrysene	BLFWS-01B	570 J	330	7, p. 166
	BLFWS-03B	2,000 J	330	7, p. 166
	BLF-SS01	430 J	330	7, p. 166
	BLF-SS02	4,700	330	7, p. 166
Dibenz(a,h)anthracene	BLF-SS02	680 J	330	7, p. 166
Fluoranthene	BLFWS-01B	1,200 J	330	7, p. 166
	BLFWS-03B	4,300 J	330	7, p. 166
	BLF-SS01	740 J	330	7, p. 166
	BLF-SS02	11,000	330	7, p. 166
Fluorene	BLF-SS02	350 J	330	7, p. 166
gamma-Chlordane	BLFWS-02B	8.3 J	1.7	7, p. 167
	BLFWS-03B	32 J	1.7	7, p. 167
	BLF-SS02	53 + J	1.7	7, p. 167
Indeno(1,2,3-cd)-pyrene	BLFWS-03B	650 J	330	7, p. 166
	BLF-SS01	390 J	330	7, p. 166
	BLF-SS02	1,900	330	7, p. 166
Naphthalene	BLFWS-02B	750	330	7, p. 165
Phenanthrene	BLFWS-01B	1,000 J	330	7, p. 166
	BLFWS-03B	1,000 J	330	7, p. 166
	BLF-SS02	5,100	330	7, p. 166
Pyrene	BLFWS-01B	1,200 J	330	7, p. 166
	BLFWS-03B	3,500 J	330	7, p. 166
	BLF-SS01	1,000	330	7, p. 166
	BLF-SS02	7,700	330	7, p. 166

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Antimony	BLFWS-01B	20.4 L	ND	12	7, pp. 12, 60, 87
	BLFWS-05B	18.2 L	ND	12	7, pp. 12, 60, 87
Arsenic	BLFWS-01B	26.3 L	4.3 L	2	7, pp. 12, 60, 87
	BLFWS-02B	21.4 L	4.3 L	2	7, pp. 12, 60, 87
	BLFWS-03B	16.5 L	4.3 L	2	7, pp. 12, 60, 87
Barium	BLFWS-01B	831	118.0	40	7, pp. 12, 60, 87
	BLFWS-03A	416	118.0	40	7, pp. 12, 60, 87
	BLFWS-03B	557	118.0	40	7, pp. 12, 60, 87
	BLFWS-04B	802	118.0	40	7, pp. 12, 60, 87
Cadmium	BLFWS-03B	13.9	ND	1	7, pp. 12, 60, 87
Chromium	BLFWS-01B	78.8	27	2	7, pp. 12, 60, 87
	BLFWS-02B	77.2	27	2	7, pp. 12, 60, 87
Copper	BLFWS-01B	3,200 J	33.7	5	7, pp. 12, 60, 87
	BLFWS-02B	547 J	33.7	5	7, pp. 12, 60, 87
	BLFWS-03B	398 J	33.7	5	7, pp. 12, 60, 87
	BLFWS-05B	935	33.7	5	7, pp. 12, 60, 87
Lead	BLFWS-01B	2,090	101	0.6	7, pp. 12, 60, 87
	BLFWS-02B	1,350	101	0.6	7, pp. 12, 60, 87
	BLFWS-03A	953	101	0.6	7, pp. 12, 60, 87
	BLFWS-03B	2,710	101	0.6	7, pp. 12, 60, 87
Mercury	BLFWS-03A	0.64	0.18	0.1	7, pp. 12, 60, 87
Nickel	BLFWS-01B	75.2	16.3	8	7, pp. 12, 60, 87
	BLFWS-03A	66.5	16.3	8	7, pp. 12, 60, 87
	BLFWS-03B	91.6	16.3	8	7, pp. 12, 60, 87
	BLFWS-04B	85.0	16.3	8	7, pp. 12, 60, 87
Silver	BLFWS-01B	4.5 L	ND	2	7, pp. 12, 60, 87
	BLFWS-05B	[2.0] L	ND	2	7, pp. 12, 60, 87
Zinc	BLFWS-01B	2,290	142	4	7, pp. 12, 60, 87
	BLFWS-02B	1,720	142	4	7, pp. 12, 60, 87
	BLFWS-03A	1,000	142	4	7, pp. 12, 60, 87
	BLFWS-05B	1,830	142	4	7, pp. 12, 60, 87

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
L Analyte present; reported value may be biased low
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
\+ Results reported from diluted sample

2.4.2 Hazardous Waste Quantity - Source 4

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 4.

Sum (pounds): Unknown
Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous wastestream quantity for Source 4.

Sum (pounds): Unknown
Hazardous Wastestream Quantity Value: NA

2.4.2.1.3 Volume

The information available is not sufficient to adequately evaluate the volume of Source 4.

Dimension of source (yd^3 or gallons): Unknown
Volume Assigned Value: 0

2.4.2.1.4 Area

According to aerial photograph interpretation, 4.5 acres of wetlands were filled-in with wastes; therefore, 4.5 acres (196,020 ft^2) was used to calculate the area of Source 4 (Ref. 81, pp. 15 and Figure 7, Ref. 23).

Area of Source (ft^2): 196,020
Area Assigned Value (Ref. 1, Table 2-5): 5.77

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value is assigned the value of the area calculated for Source 4.

Source Hazardous Waste Quantity Value: 5.77

2.2 Source Characterization

Source Number: 5 - Industrial Enterprises/Unclaimed Landfill

Source Description: Landfill

Source Type: Landfill

Source 5 is an area located in the southeastern portion of the 68th Street Dump site. According to the State of Maryland Taxation and Assessment Map for the area, this portion of the 68th Street Dump site is occupied by four separate parcels of property. Industrial Enterprises, Inc. owns three of the parcels (parcels 15, 16, and 117); the fourth parcel is an area with no owner on record (Ref. 5, pp. 1, 9 through 11). Parcel 15 is separated into two, non-contiguous sections; a small section located north of Quad Avenue (included as part of Source 5), and a larger section located to the south of Quad Avenue (not included in this HRS documentation record) (Ref. 5, p. 1).

In September 1955, at the request of Robb Tyler, the MD DHMH inspected land located in this area, owned by Industrial Enterprises, Inc., to determine if a landfill could be established here. The area was described in a subsequent inspection report as being partially located on high ground, with the remainder being marshland (Ref. 38). On December 27, 1955, Robb Tyler obtained Baltimore County Department of Health permit number 19 to dispose of waste on property he leased from Industrial Enterprises, Inc. (Ref. 8, p. 19). Robb Tyler's use of the unclaimed parcel of land was first documented in a Baltimore County Health Department inspection report from 1956 (Ref. 8, pp. 44 and 46). The inspector noted at this time that Tyler was dumping on property he did not own or rent (Ref. 8, p. 46).

Documentation of the type of activities that occurred on Source 5 can be found in Baltimore County Health Department inspection reports. A 1956 report describes the dumping of waste "at a place where high ground slopes steeply down to a tidal marsh" (Ref. 8, p. 44). On the slope a large pit was observed where waste oil was being dumped. The pit was located "down near the water" and contained oil at the time of the inspection (Ref. 8, p. 44). The fill was being dumped out into the marsh to dike the Back River (Herring Run) and allow more dumping to occur in the area formerly occupied by wetlands (Ref. 8, p. 44). The fill reportedly contacted the water along much of the original shoreline. The inspector noted that "in places the fill has imparted a black deoxygenated look to the water" (Ref. 8, p. 44). One such place was near the oil pit (Ref. 8, p. 44). A September 5, 1957 inspection report further documents that fill was observed "adjacent to tidewater" and that on occasion "debris which had escaped from the edge of the fill has been carried out in the main stream by tidal action" (Ref. 51, p. 2).

In 1979, during a reconnaissance of Source 5, inspectors from the Maryland Department of Natural Resources, Water Resources Administration discovered drums containing a gray-green solid that had been dumped into a ravine located in a wetland area on parcel 15, north of Quad Avenue. Many of the drums were deformed or crushed, with their contents exposed and in many cases spilling out (Ref. 41; Ref. 43; Ref. 45; Ref. 52, pp. 5, 6, and 108). Some of this material consisted of residue from a final plating bath from the Baltimore Galvanizing Company, which operated a facility adjacent to this location (Ref. 41; Ref. 42; Ref. 45). This waste contained large amounts of zinc and was classified as hazardous due to lead and cadmium concentrations exceeding EP Toxicity levels (Ref. 43; Ref. 44). A Maryland Water Resources Administration report documents that in 1975 Robb Tyler was disposing of the solids generated by Baltimore Galvanizing Company (Ref. 46). In 1982, a Baltimore County Circuit Court ordered Industrial Enterprises, Inc. and Baltimore Galvanizing Company to excavate and properly dispose of the drums and associated material. Subsequently, up to 23 drums were excavated from this area and transported off site for disposal. One-half to two-thirds of these drums contained the grayish-green sludge material; the remaining drums were empty due to being crushed (Ref. 29, p. 2; Ref. 45, p. 2).

The discovery of the drums on parcel 15 led to the inclusion of the Industrial Enterprises, Inc site onto the State of Maryland's list of Potential Hazardous Waste Sites (Ref. 15, p. 2). A site reconnaissance was subsequently performed by MD WMA on March 5, 1985 (Ref. 15, p. 3). The MD WMA inspection team began the site reconnaissance by entering the property at the end of Quad Avenue and proceeded along the foot path toward the southeast corner of Source 5 (Ref. 15, p. 3). Approximately one-quarter of a mile into the property, a small stream was observed. The inspection team noted that booms and absorbent pads had been placed in this stream. Closer inspection of the stream revealed a black, oil-like substance seeping from the embankment adjacent to the stream. It was subsequently determined that the MD Department of Natural Resources had placed the booms into the water to contain the oil-like substance (Ref. 15, p. 3). Samples were collected of this seep for laboratory analysis. Analytical results indicated the seep contained PCBs (Ref. 48; Ref. 49). The location of this seep was subsequently determined to be on parcel 16 (Ref. 47; Ref. 53). The oil seep observed by MD WMA was located adjacent to the former waste oil pit described in 1956 by Baltimore County Health inspectors (Ref. 8, p. 44; Ref. 15, p. 6).

Also during the MD WMA reconnaissance of Source 5, the inspection team observed a pit located in the southeast portion of Source 5 (parcel 117). The pit measured about 120 by 50 feet and was filled with numerous truck and automobile tires (Ref. 15, pp. 4 and 24). The inspection team proceeded to the area of Source 5 located to the northwest of Quad Avenue. In this area, the MD WMA inspection team observed an estimated 5 to 8 acres which were filled with broken concrete, rebarrs, asphalt, old tires, scrap metal, and hundreds of buried and partially exposed 55-gallon drums. The entire surface of this area was noted to be "distorted and convoluted" with an assortment of construction debris and industrial wastes landfilled under the grass (Ref. 15, pp. 4 and 24).

Aerial photographs beginning in 1957 document the disposal of wastes at Source 5. A lagoon containing a "dark-toned standing liquid" was observed on the 1957 aerial in the area where the oil pit was reportedly located (Ref. 12, pp. 16 and 17). The aerial photograph taken in 1966 indicates that an automobile salvage yard was located on parcel 117 (Ref. 12, pp. 22 and 23). The disposal of wastes throughout Source 5 is evident on aerial photographs taken from 1957 through 1973 (Ref. 12, pp. 16 through 29).

Aerial photography from 1938 document that the entire area of Source 5 was covered in tidal emergent PSS/FO wetlands (Ref. 81, pp. 8 and Figure 3). Historical aerial photographs dated 1950, 1957, 1964, and 1968 resulting in a total loss of 33.9 acres of wetlands (Ref. 81, pp. 13, 14, and 15).

<u>Source Location</u> :

Source 5 occupies the land located to the northeast, east, and southeast of the end of Quad Avenue (see Figure 3 in Appendix A).

Containment:

Release to Ground Water: The ground water pathway was not scored.

Release via overland migration and/or flood: There is no evidence that a maintained engineered cover or functioning and maintained run-on control system and runoff management system was in place at Source 5. There is also no documentation that containment at the source was designed, constructed, operated, and maintained to prevent a washout of hazardous substances by a flood. For these reasons a containment factor value of 10 was assigned (Ref. 1, Tables 4-2 and 4-8).

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

2.4.1 Hazardous Substances - Source 5

Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of wastes was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156 and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that predominately covered all five source areas located at the site during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these wastestreams have been summarized in Table 1 in Appendix B. Wastes from most of these generators may have been disposed of at all five of the sources that comprise the site. Interviews of former waste haulers indicate that wastes were dumped at various areas of the site. Drivers were told where to dump their waste by the scale house operator or bulldoze operator after arrival at the dump (Ref. 10, pp.13, 14, 23, 24, 32, 44, 66, 113, 121, 124, 134 and 154). EPA's aerial photography analysis of wetland loss completed for the site supports the conclusion that from the late 1950s through 1968, dumping of wastes was occurring into the wetlands of all five sources (Ref. 81, p. 15 and Figures 3 through 7).

In some cases, available information is sufficient to document that a particular wastestream was disposed of at a specific source. Evidence indicates that wastestreams generated by the following industries were disposed of at Source 5: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; GAF Materials; Armco; Koppers; the O'Brien Company; General Motors; Crown, Cork, & Seal; Bruning Paint Company; SCM (Glidden Durkee, Co.); Exxon (Standard Oil); Signode Steel and the Baltimore Sun. Hazardous substances associated with the wastestreams generated by these industries include trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

In addition, a deposition from a truck driver that hauled waste for Robb Tyler from the 1950s to 1979 provides documentation of the existence of pits located at Source 5 for the disposal of sludges and paint wastes. According to this deposition, wastes generated from General Motors, Signode Steel, O'Brien Paint, and Thompson's Wire were disposed of into two pits located at Source 5. The deponent testified the size of the pits to be "two or three hundred yard around it" (Ref. 83, pp. 5, 9, 10, 15, 17, 18, 19, 21, 28, 29, 48, 64, 65, 66, 69).

Additional evidence of hazardous waste disposal at Source 5 is provided by debris observed during test pit excavations completed during the EPA ESI completed in 2000. Roofing materials, such as tar pitch and shingles, ash, 55-gallon drums and oil seeps were observed in these excavations (Ref. 82, Logbook 1, pp. 13,14, 15, 34, 38). In an area where seven drums were observed, a very strong acetic acid smell was detected in an excavation pit at a depth of 3 feet (Ref. 82, Logbook 1, p. 36). Laboratory analysis of the sample collected from this pit, UCLF-WS07B, verified the existence of various hazardous substances (Ref. 7, pp. 141 and 142). Evidence of the oil pits observed on aerial photographs and described in

Baltimore County Department of Health inspection reports were also documented during these excavations. One test pit filled with 2 feet of oil during excavation (Ref. 82, Logbook 1, p. 35). Laboratory analysis of the sample collected from this pit, UCLF-WS05B, verified the existence of various hazardous substances (Ref. 7, pp. 139 and 140).

The 55-gallon drums of plating sludge discovered in 1979 in wetlands located on Source 5 (parcel 15) contained large amounts of zinc (Ref. 41; Ref. 43; Ref. 44; Ref. 45). Analysis of a sample of the waste material revealed a zinc concentration of 486,000 parts per million or 48.6% (Ref. 41; Ref. 43). Laboratory analysis of the contents of the drums determined the waste to be classified as hazardous because the concentrations of lead and cadmium exceeded EP Toxicity levels (Ref. 44).

The presence of hazardous substances at Source 5 is further established by the results of samples collected from Source 5 on two occasions: (1) in 1989 by MD WMA and (2) in 2000 by the EPA Region 3 SATA team.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Butylbenzylphthalate	SS-1	3,000	330	52, Vol. I, p. 66; Vol. II, p. 150
Aroclor-1254	SS-1	480	160	52, Vol. I, p. 66; Vol. II, p. 151
Fluroanthene	SS-1	150 J	330	52, Vol. I, p. 66; Vol. II, p. 150
Bis(2-ethylhexyl)phthalate	SS-1	360 J	330	52, Vol. I, p. 66; Vol. II, p. 150
Benzo(k)fluoranthene	SS-1	140 J	330	52, Vol. I, p. 66; Vol. II, p. 150
Fluoranthene	SS-4	430	330	52, Vol. I, p. 66; Vol. II, p. 164
Pyrene	SS-4	510	330	52, Vol. I, p. 66; Vol. II, p. 164
Bis(2-ethylhexyl)phthalate	SS-4	430	330	52, Vol. I, p. 66; Vol. II, p. 164

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (SS-6)	CRDL (mg/kg)	Reference

Also during the 1989 SI the MD WMA collected a sediment sample from the pit filled with tires that is located in the eastern portion of Source 5 (Ref. 15, p. 4; Ref. 54, p. 5; Ref. 52, Vol. I, p. 111). Analytical results from this sample are shown in the table below.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Phenanthrene	SED-4	1,100	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Fluoranthene	SED-4	950	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Pyrene	SED-4	1,100	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Benzo(a)anthracene	SED-4	1,200	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Chrysene	SED-4	1,400	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Benzo(a)pyrene	SED-4	970	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Benzo(k)fluoranthene	SED-4	2,800	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Indeno(1,2,3-cd)pyrene	SED-4	810	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Benzo(g,h,i)perylene	SED-4	790	330	52, Vol. I, pp. 66 and 111; Vol. II, p. 146
Aroclor-1254	SED-4	5,100	160	52, Vol. I, pp. 66 and 111; Vol. II, p. 147

Notes:
CRQL Contract-required quantitation limit
µg/kg Micrograms per kilogram

EPA SATA Team Sample Results - 2000

The EPA Region 3 SATA team collected samples from Source 5 during the ESI conducted in 2000. Sampling locations are shown in Figure 3 in Appendix A. These samples were analyzed for organic and inorganic parameters using CLP protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples analyzed for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 5 during the sampling event. To identify metal concentrations exceeding background levels, the metal concentrations detected at Source 5 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Organics				
1,1'-Biphenyl	UCLF-WS04B	1,600 J	330	7, p. 139
2-Methylnaphthalene	UCLF-WS09B	55,000 J	330	7, p. 141
2-Methylphenol	UCLF-WS02B	810 J	330	7, p. 139
	UCLF-WS04B	460 J	330	7, p. 139
2-Nitrophenol	UCLF-WS04B	700 J	330	7, p. 139
Acenaphthene	UCLF-WS02B	830 J	330	7, p. 139
	UCLF-WS04B	10,000	330	7, p. 139
	UCLF-WS05B	6,000 J	330	7, p. 139
	UCLF-WS07B	490 J	330	7, p. 141
	UCLF-WS10B	1,100 J	330	7, p. 143
	UCLF-WS14B	1,100 J	330	7, p. 143
Anthracene	IELF-WS03A	550 J	330	7, p. 150
	IELF-WS03C	2,600	330	7, p. 152
	UCLF-WS02B	1,700 J	330	7, p. 140
	UCLF-WS04B	11,000	330	7, p. 140
	UCLF-WS07B	1,200	330	7, p. 142
	UCLF-WS08B	1,200 J	330	7, p. 142
	UCLF-WS14B	970 J	330	7, p. 144
Benzo(a)anthracene	IELF-WS03A	2,900	330	7, p. 150
	IELF-WS03C	4,800	330	7, p. 152
	UCLF-WS02B	5,200	330	7, p. 140
	UCLF-WS04B	18,000	330	7, p. 140
	UCLF-WS07B	2,200	330	7, p. 142
	UCLF-WS08B	3,600	330	7, p. 142
	UCLF-WS12A	720 J	330	7, p. 144
	UCLF-WS14B	1,600 J	330	7, p. 144
	IELFWS-02A	360 J	330	7, p. 150
Benzo(b)fluoranthene	IELF-WS03A	3,200	330	7, p. 150
	IELF-WS03C	4,300	330	7, p. 152
	UCLF-WS02B	4,200	330	7, p. 140
	UCLF-WS04B	11,000 +	330	7, p. 140
	UCLF-WS07B	1,700	330	7, p. 142
	UCLF-WS08B	3,900	330	7, p. 142
	UCLF-WS12A	660 J	330	7, p. 144

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Benzo(b)fluoranthene (Continued)	UCLF-WS14B	1,200 J	330	7, p. 144
	IELFWS-02A	430	330	7, p. 150
	IELFWS-02B	400	330	7, p. 150
Benzo(k)fluoranthene	IELF-WS03A	2,900	330	7, p. 150
	IELF-WS03C	3,800	330	7, p. 152
	UCLF-WS02B	4,700	330	7, p. 140
	UCLF-WS04B	6,800	330	7, p. 140
	UCLF-WS07B	1,500 J	330	7, p. 142
	UCLF-WS08B	2,100 J	330	7, p. 142
	UCLF-WS12A	630 J	330	7, p. 144
	UCLF-WS14B	1,300 J	330	7, p. 144
	IELFWS-02A	440	330	7, p. 150
	IELFWS-02B	350 J	330	7, p. 150
Benzo(a)pyrene	IELF-WS03A	3,400	330	7, p. 150
	IELF-WS03C	4,400	330	7, p. 152
	UCLF-WS02B	4,900	330	7, p. 140
	UCLF-WS04B	17,000	330	7, p. 140
	UCLF-WS07B	1,700	330	7, p. 142
	UCLF-WS08B	3,300	330	7, p. 142
	UCLF-WS12A	800	330	7, p. 144
	UCLF-WS14B	1,300 J	330	7, p. 144
	IELFWS-02A	390	330	7, p. 150
	IELFWS-02B	330 J	330	7, p. 150
Benzo(g,h,i)perylene	IELF-WS03A	1,400	330	7, p. 150
	IELF-WS03C	1,200 J	330	7, p. 152
	UCLF-WS02B	2,100 J	330	7, p. 140
	UCLF-WS04B	7,000	330	7, p. 140
	UCLF-WS07B	620 J	330	7, p. 142
	UCLF-WS08B	1,000 J	330	7, p. 142
	UCLF-WS12A	530 J	330	7, p. 144
bis(2-Chloroethoxy)methane	UCLF-WS02B	760 J	330	7, p. 139

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
bis(2-Ethylhexyl)phthalate	UCLF-WS02B	21,000	330	7, p. 140
	UCLF-WS03B	1,500	330	7, p. 140
	UCLF-WS04B	6,600	330	7, p. 140
	UCLF-WS05B	58,000	330	7, p. 140
	UCLF-WS06B	1,600	330	7, p. 142
	UCLF-WS07B	2,300	330	7, p. 142
	UCLF-WS11B	440,000 +	330	7, p. 144
	UCLF-WS12B	2,400	330	7, p. 144
	UCLF-WS14B	39,000	330	7, p. 144
Butylbenzylphthalate	IELF-WS03A	14,000	330	7, p. 150
	IELF-WS03C	910 J	330	7, p. 152
	UCLF-WS02B	1,800 J	330	7, p. 140
	UCLF-WS04B	5,800	330	7, p. 140
	UCLF-WS05A	710 J	330	7, p. 140
	UCLF-WS07B	2,300	330	7, p. 142
	UCLF-WS08B	360 J	330	7, p. 142
	UCLF-WS11B	53,000	330	7, p. 144
	UCLF-WS13B	77,000	330	7, p. 144
	UCLF-WS14B	1,700 J	330	7, p. 144
	UCLF-WS15B	41,000	330	7, p. 144
	IELFWS-02A	650	330	7, p. 150
Carbazole	IELF-WS03C	750 J	330	7, p. 152
	UCLF-WS02B	520 J	330	7, p. 140
	UCLF-WS04B	2,700	330	7, p. 140
	UCLF-WS07B	340 J	330	7, p. 142
4-Chlorophenyl-phenyl ether	UCLF-WS02B	1,200 J	330	7, p. 140
	UCLF-WS04B	12,000	330	7, p. 140
	UCLF-WS05B	12,000 J	330	7, p. 140
	UCLF-WS07B	580 J	330	7, p. 142
	UCLF-WS08B	650 J	330	7, p. 142
	UCLF-WS14B	1,500 J	330	7, p. 144
Chrysene	IELF-WS03A	3,000	330	7, p. 150
	IELF-WS03C	5,200	330	7, p. 152
	UCLF-WS02B	5,700	330	7, p. 140
	UCLF-WS04B	19,000	330	7, p. 140

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Chrysene (Continued)	UCLF-WS05B	5,200 J	330	7, p. 140
	UCLF-WS07B	2,300	330	7, p. 142
	UCLF-WS08B	3,800	330	7, p. 142
	UCLF-WS10B	1,300 J	330	7, p. 144
	UCLF-WS11B	2,200 J	330	7, p. 144
	UCLF-WS12A	830	330	7, p. 144
	UCLF-WS14B	1,900 J	330	7, p. 144
	IELFWS-02A	430	330	7, p. 150
	IELFWS-02B	420	330	7, p. 150
Dibenz(a,h)anthracene	IELF-WS03A	640 J	330	7, p. 150
	IELF-WS03C	700 J	330	7, p. 152
	UCLF-WS08B	510 J	330	7, p. 142
	UCLF-WS02B	720 J	330	7, p. 140
	UCLF-WS04B	3,700	330	7, p. 140
Dibenzofuran	IELF-WS03C	600 J	330	7, p. 152
	UCLF-WS02B	450 J	330	7, p. 140
	UCLF-WS04B	9,700	330	7, p. 140
	UCLF-WS08B	360 J	330	7, p. 142
	UCLF-WS14B	920 J	330	7, p. 144
Diethylphthalate	UCLF-WS04B	370 J	330	7, p. 140
Di-n-butylphthalate	UCLF-WS10B	6,400 J	330	7, p. 144
	UCLF-WS11B	2,000 J	330	7, p. 144
2,6-Dinitrotoluene	UCLF-WS04B	390 J	330	7, p. 139
	UCLF-WS08B	710 J	330	7, p. 141
Fluoranthene	IELF-WS03A	4,500	330	7, p. 150
	IELF-WS03C	9,700	330	7, p. 152
	UCLF-WS02B	9,800	330	7, p. 140
	UCLF-WS04B	38,000 +	330	7, p. 140
	UCLF-WS07B	5,600	330	7, p. 142
	UCLF-WS08B	8,100	330	7, p. 142
	UCLF-WS10B	710 J	330	7, p. 144
	UCLF-WS11B	4,000 J	330	7, p. 144
	UCLF-WS12A	1,800	330	7, p. 144
	UCLF-WS12B	450	330	7, p. 144
	UCLF-WS14B	7,000	330	7, p. 144

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Fluoranthene (Continued)	IELFWS-02A	610	330	7, p. 150
	IELFWS-02B	820	330	7, p. 150
	IELFWS-08B	490	330	7, p. 154
Fluorene	IELF-WS03C	1,300 J	330	7, p. 152
	UCLF-WS11B	1,700 J	330	7, p. 144
gamma-chlordane	IELFWS-03A	13 J	1.7	7, p. 155
	IELFWS-03C	8.8 J	1.7	7, p. 156
	IELFWS-02A	5.9 J	1.7	7, p. 155
Indeno(1,2,3-cd)-pyrene	IELF-WS03A	1,700 J	330	7, p. 150
	IELF-WS03C	1,400 J	330	7, p. 152
	UCLF-WS02B	1,900 J	330	7, p. 140
	UCLF-WS04B	7,500	330	7, p. 140
	UCLF-WS07B	600 J	330	7, p. 142
	UCLF-WS08B	1,100 J	330	7, p. 142
2-Methylnaphthalene	UCLF-WS02B	730 J	330	7, p. 139
	UCLF-WS04B	4,100	330	7, p. 139
	UCLF-WS05B	37,000 J	330	7, p. 139
	UCLF-WS10B	2,100 J	330	7, p. 143
	UCLF-WS14B	2,100 J	330	7, p. 143
Naphthalene	UCLF-WS02B	1,500 J	330	7, p. 139
	UCLF-WS04B	4,400	330	7, p. 139
	UCLF-WS05B	20,000 J	330	7, p. 139
	UCLF-WS07B	560 J	330	7, p. 141
	UCLF-WS08B	370 J	330	7, p. 141
	UCLF-WS09B	350,000	330	7, p. 141
	UCLF-WS10B	800 J	330	7, p. 143
	UCLF-WS13B	2,700 J	330	7, p. 143
	UCLF-WS14B	800 J	330	7, p. 143
2-Nitrophenol	UCLF-WS08B	1,400 J	830	7, p. 141
n-Nitroso-di-n-propylamine	UCLF-WS02B	19,000	330	7, p. 139
	UCLF-WS04B	25,000 +	330	7, p. 139
	UCLF-WS07B	1,300	330	7, p. 141
	UCLF-WS12B	1,100	330	7, p. 143

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Phenanthrene	IELF-WS03A	2,100 J	330	7, p. 150
	IELF-WS03C	7,000	330	7, p. 152
	UCLF-WS02B	6,200	330	7, p. 140
	UCLF-WS04B	50,000 +	330	7, p. 140
	UCLF-WS05B	33,000 J	330	7, p. 140
	UCLF-WS07B	4,100	330	7, p. 142
	UCLF-WS08B	2,100 J	330	7, p. 142
	UCLF-WS09B	8,300 J	330	7, p. 142
	UCLF-WS11B	5,400 J	330	7, p. 144
	UCLF-WS12A	1,200	330	7, p. 144
	UCLF-WS12B	340 J	330	7, p. 144
	UCLF-WS13B	1,900 J	330	7, p. 144
	UCLF-WS14B	6,600	330	7, p. 144
	IELFWS-2A	370 J	330	7, p. 150
	IELFWS-02B	560	330	7, p. 150
	IELFWS-08B	360 J	330	7, p. 154
Phenol	UCLF-WS02B	3,800	330	7, p. 139
	UCLF-WS04B	1,900 J	330	7, p. 139
Pyrene	IELF-WS03A	4,300	330	7, p. 150
	IELF-WS03C	9,100	330	7, p. 152
	UCLF-WS02B	10,000	330	7, p. 140
	UCLF-WS04B	30,000 +	330	7, p. 140
	UCLF-WS05B	6,200 J	330	7, p. 140
	UCLF-WS07B	4,000	330	7, p. 142
	UCLF-WS08B	5,700	330	7, p. 142
	UCLF-WS10B	1,700 J	330	7, p. 144
	UCLF-WS11B	3,000 J	330	7, p. 144
	UCLF-WS12A	1,500	330	7, p. 144
	UCLF-WS12B	400 J	330	7, p. 144
	UCLF-WS14B	4,500 J	330	7, p. 144
	IELFWS-02A	690	330	7, p. 150
	IELFWS-02B	680	330	7, p. 150
	IELFWS-08B	420	330	7, p. 154
Aroclor-1242	UCLF-WS02B	1,600 J	33	7, p. 145

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL (µg/kg)	Reference
Aroclor-1254	IELF-WS03C	67 J	33	7, p. 156
	UCLF-WS06C	1,400 +J	33	7, p. 146
	UCLF-WS08B	580 J	33	7, p. 146
	UCLF-WS15B	1,100 +J	33	7, p. 147
Aroclor-1260	IELF-WS03A	100 J	33	7, p. 155
	UCLF-WS06B	6,500 +	33	7, p. 146
	IELFWS-02A	65 J	33	7, p. 155

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Metals					
Antimony	UCLF-WS11B	30.6	ND	12	7, pp. 12, 52, 87
	UCLF-WS14B	37.2	ND	12	7, pp. 12, 52, 87
	UCLF-WS15B	25.2	ND	12	7, pp. 12, 52, 87
Arsenic	IELF-WS03C	51.6	4.3 L	2	7, pp. 12, 55, 87
	UCLF-WS03B	15.5	4.3 L	2	7, pp. 12, 50, 87
	UCLF-WS04B	38.9	4.3 L	2	7, pp. 12, 50, 87
	UCLF-WS06B	37.1	4.3 L	2	7, pp. 12, 51, 87
	UCLF-WS08B	25.0	4.3 L	2	7, pp. 12, 51, 87
	UCLF-WS10B	38.9	4.3 L	2	7, pp. 12, 51, 87
	UCLF-WS11B	34.2	4.3 L	2	7, pp. 12, 52, 87
	UCLF-WS13B	19.3	4.3 L	2	7, pp. 12, 52, 87
	UCLF-WS14B	22.6	4.3 L	2	7, pp. 12, 52, 87
	UCLF-WS15B	19.0	4.3 L	2	7, pp. 12, 52, 87
Barium	UCLF-WS02B	556	118.0	40	7, pp. 12, 50, 87
	UCLF-WS03B	546	118.0	40	7, pp. 12, 50, 87
	UCLF-WS04B	505	118.0	40	7, pp. 12, 50, 87
	UCLF-WS07B	523	118.0	40	7, pp. 12, 51, 87
	UCLF-WS11B	3,290 +	118.0	40	7, pp. 12, 52, 87
	UCLF-WS12B	546	118.0	40	7, pp. 12, 52, 87
	UCLF-WS13B	367	118.0	40	7, pp. 12, 52, 87
	UCLF-WS14B	494	118.0	40	7, pp. 12, 52, 87
	UCLF-WS15B	434	118.0	40	7, pp. 12, 52, 87
Beryllium	UCLF-WS04B	[1.2]	ND	1	7, pp. 12, 50, 87
	UCLF-WS06B	1.8	ND	1	7, pp. 12, 51, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Cadmium	UCLF-WS06B	3.8	ND	1	7, pp. 12, 51, 87
	UCLF-WS11B	9.6	ND	1	7, pp. 12, 52, 87
	UCLF-WS12C	3.1	ND	1	7, pp. 12, 52, 87
	UCLF-WS14B	9.5	ND	1	7, pp. 12, 52, 87
	UCLF-WS15B	4.7	ND	1	7, pp. 12, 52, 87
Chromium	IELF-WS03A	94.4 L	27	2	7, pp. 12, 54, 87
	UCLF-WS05A	990	27	2	7, pp. 12, 50, 87
	UCLF-WS06B	1,660	27	2	7, pp. 12, 51, 87
	UCLF-WS09B	290 J	27	2	7, pp. 12, 51, 87
	UCLF-WS10B	138 J	27	2	7, pp. 12, 51, 87
	IELFWS-02A	120 L	27	2	7, pp. 12, 54, 87
Copper	IELF-WS03A	244 J	33.7	5	7, pp. 12, 54, 87
	IELF-WS03C	374 J	33.7	5	7, pp. 12, 55, 87
	UCLF-WS02B	324	33.7	5	7, pp. 12, 50, 87
	UCLF-WS03B	1,870	33.7	5	7, pp. 12, 50, 87
	UCLF-WS04B	672	33.7	5	7, pp. 12, 50, 87
	UCLF-WS05A	107	33.7	5	7, pp. 12, 50, 87
	UCLF-WS06B	411	33.7	5	7, pp. 12, 51, 87
	UCLF-WS07B	329 J	33.7	5	7, pp. 12, 51, 87
	UCLF-WS08B	5,240 J	33.7	5	7, pp. 12, 51, 87
	UCLF-WS09B	179 J	33.7	5	7, pp. 12, 51, 87
	UCLF-WS10B	701 J	33.7	5	7, pp. 12, 51, 87
	UCLF-WS11B	1,090 J	33.7	5	7, pp. 12, 52, 87
	UCLF-WS12B	4,030 J	33.7	5	7, pp. 12, 52, 87
	UCLF-WS12C	578 J	33.7	5	7, pp. 12, 52, 87
	UCLF-WS13B	196 J	33.7	5	7, pp. 12, 52, 87
	UCLF-WS14B	553 J	33.7	5	7, pp. 12, 52, 87
	UCLF-WS15B	318 J	33.7	5	7, pp. 12, 52, 87
	IELFWS-02A	140 J	33.7	5	7, pp. 12, 54, 87
Lead	IELF-WS03A	546	101	0.6	7, pp. 12, 54, 87
	IELF-WS03C	2,400	101	0.6	7, pp. 12, 55, 87
	UCLF-WS02B	1,500	101	0.6	7, pp. 12, 50, 87
	UCLF-WS03B	1,150	101	0.6	7, pp. 12, 50, 87
	UCLF-WS04B	1,350	101	0.6	7, pp. 12, 50, 87
	UCLF-WS06B	474	101	0.6	7, pp. 12, 51, 87
	UCLF-WS07B	992 J	101	0.6	7, pp. 12, 51, 87
	UCLF-WS08B	1,970 J	101	0.6	7, pp. 12, 51, 87
	UCLF-WS09B	534 J	101	0.6	7, pp. 12, 51, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Lead (Continued)	UCLF-WS10B	241 J	101	0.6	7, pp. 12, 51, 87
	UCLF-WS11B	4,720 J	101	0.6	7, pp. 12, 52, 87
	UCLF-WS12B	1,070 J	101	0.6	7, pp. 12, 52, 87
	UCLF-WS12C	441 J	101	0.6	7, pp. 12, 52, 87
	UCLF-WS13B	490 J	101	0.6	7, pp. 12, 52, 87
	UCLF-WS14B	2,020 J	101	0.6	7, pp. 12, 52, 87
	UCLF-WS15B	1,880 J	101	0.6	7, pp. 12, 52, 87
	IELFWS-02A	459	101	0.6	7, pp. 12, 54, 87
	IELFWS-02B	599	101	0.6	7, pp. 12, 54, 87
	IELFWS-08B	374	101	0.6	7, pp. 12, 56, 87
Manganese	UCLF-WS05A	13,300 +	487	3	7, pp. 12, 50, 87
Mercury	UCLF-WS07B	1.0	0.18	0.1	7, pp. 12, 51, 87
	UCLF-WS08B	4.4	0.18	0.1	7, pp. 12, 51, 87
	UCLF-WS09B	6.5	0.18	0.1	7, pp. 12, 51, 87
	UCLF-WS11B	4.0	0.18	0.1	7, pp. 12, 52, 87
	UCLF-WS14B	0.60	0.18	0.1	7, pp. 12, 52, 87
Nickel	IELF-WS03A	78.4	16.3	8	7, pp. 12, 54, 87
	UCLF-WS03B	106	16.3	8	7, pp. 12, 50, 87
	UCLF-WS04B	66.4	16.3	8	7, pp. 12, 50, 87
	UCLF-WS06B	198	16.3	8	7, pp. 12, 51, 87
	UCLF-WS08B	446	16.3	8	7, pp. 12, 51, 87
	UCLF-WS09B	151	16.3	8	7, pp. 12, 51, 87
	UCLF-WS10B	83.0	16.3	8	7, pp. 12, 51, 87
	UCLF-WS11B	120	16.3	8	7, pp. 12, 52, 87
	UCLF-WS12B	84.8	16.3	8	7, pp. 12, 52, 87
	UCLF-WS12C	51.1	16.3	8	7, pp. 12, 52, 87
	UCLF-WS13B	72.5	16.3	8	7, pp. 12, 52, 87
	UCLF-WS14B	128	16.3	8	7, pp. 12, 52, 87
	IELFWS-02A	63.3	16.3	8	7, pp. 12, 54, 87
Silver	IELF-WS03A	2.5	ND	2	7, pp. 12, 54, 87
	IELF-WS03C	6.8	ND	2	7, pp. 12, 55, 87
	UCLF-WS02B	4.7	ND	2	7, pp. 12, 50, 87
	UCLF-WS03B	8.6	ND	2	7, pp. 12, 50, 87
	UCLF-WS04B	5.5	ND	2	7, pp. 12, 50, 87
	UCLF-WS05A	6.3	ND	2	7, pp. 12, 50, 87
	UCLF-WS05B	[2.6]	ND	2	7, pp. 12, 50, 87
	UCLF-WS06B	5.9	ND	2	7, pp. 12, 51, 87
	UCLF-WS07B	4.6	ND	2	7, pp. 12, 51, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL (mg/kg)	Reference
Silver (Continued)	UCLF-WS08B	[2.6]	ND	2	7, pp. 12, 51, 87
	UCLF-WS10B	[2.2]	ND	2	7, pp. 12, 51, 87
	UCLF-WS11B	7.8	ND	2	7, pp. 12, 52, 87
	UCLF-WS12B	10.8	ND	2	7, pp. 12, 52, 87
	UCLF-WS12C	3.2	ND	2	7, pp. 12, 52, 87
	UCLF-WS13B	4.0	ND	2	7, pp. 12, 52, 87
	UCLF-WS14B	7.8	ND	2	7, pp. 12, 52, 87
	UCLF-WS15B	5.2	ND	2	7, pp. 12, 52, 87
	IELFWS-02A	2.6	ND	2	7, pp. 12, 54, 87
Zinc	IELF-WS03C	2,010	142	4	7, pp. 12, 55, 87
	UCLF-WS02B	1,200	142	4	7, pp. 12, 50, 87
	UCLF-WS03B	1,970	142	4	7, pp. 12, 50, 87
	UCLF-WS04B	1,260	142	4	7, pp. 12, 50, 87
	UCLF-WS06B	1,280	142	4	7, pp. 12, 51, 87
	UCLF-WS07B	1,950 K	142	4	7, pp. 12, 51, 87
	UCLF-WS08B	629 K	142	4	7, pp. 12, 51, 87
	UCLF-WS09B	643 K	142	4	7, pp. 12, 51, 87
	UCLF-WS11B	2,560 K	142	4	7, pp. 12, 52, 87
	UCLF-WS12B	1,460 K	142	4	7, pp. 12, 52, 87
	UCLF-WS12C	4,330 K	142	4	7, pp. 12, 52, 87
	UCLF-WS13B	5,200 K	142	4	7, pp. 12, 52, 87
	UCLF-WS14B	1,560 K	142	4	7, pp. 12, 52, 87
	UCLF-WS15B	1,250 K	142	4	7, pp. 12, 52, 87

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the quantitation or detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
\+ Results reported from diluted sample

2.4.2 Hazardous Waste Quantity - Source 5

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 5.

Sum (pounds): Unknown
Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

The information available is not sufficient to adequately evaluate the hazardous wastestream quantity for Source 5.

Sum (pounds): Unknown
Hazardous Wastestream Quantity Value: NA

2.4.2.1.3 Volume

The information available is not sufficient to adequately evaluate the volume of Source 5.

Dimension of source (yd^3 or gallons): Unknown
Volume Assigned Value: 0

2.4.2.1.4 Area

According to aerial photograph interpretation, 60.6 acres of land were used for waste disposal; therefore, 60.6 acres (2,639,736 ft^2) was used to calculate the area of Source 5 (Ref. 12, pp. 18 through 27; Ref. 23).

Area of Source (ft^2): 2,639,736
Area Assigned Value: 77.6

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value is assigned the value for the area of waste disposed of at Source 5.

Source Hazardous Waste Quantity Value: 77.6

SUMMARY OF SOURCES EVALUATED

Source No.	Source Name	Source Hazardous Waste Quantity Value	Source Containment Values			
			Ground Water	Surface Water	Air Gas	Air Particulate
1	Colgate Pay Dump/Original Landfill	69.8	NS	10	NS	NS
2	Horseshoe Landfill	20.1	NS	10	NS	NS
3	Island Landfill	7.56	NS	10	NS	NS
4	Redhouse Run Landfill	5.77	NS	10	NS	NS
5	Industrial Enterprises/Unclaimed Landfill	77.6	NS	10	NS	NS

NS = Not Scored

Sum of Hazardous Waste Quantity (HWQ) Values: 180.83

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT

Wastes disposed of at the five sources that comprise the 68th Street dump site were deposited directly into the wetlands that at one time predominately covered the entire site (Ref. 81, Figure 3). The hazardous substance migration path of hazardous substances from at each source is outlined below.

<u>Source 1</u>

Prior to landfilling, this source was predominately covered with PSS/FO and PEM wetlands located adjacent to Herring Run and Moore's Run. The only area not historically designated as wetlands was located in the northern portion of the source (Ref. 81, Figure 3). The historical aerial photography study completed for the site documents that the wetlands located adjacent to Moore's Run and Herring Run were landfilled with wastes; therefore, the probable point of entry (PPE) into surface waters of the hazardous substances documented in these wastes is in these wetlands (Ref. 81, Figures 3 and 7). The wetlands located in the north-eastern portion of Source 1 would eventually have discharged into Moore's Run, the wetlands located in the southern portion of Source 1 would eventually discharge into Herring Run. The in-water segment of the surface water pathway TDL was determined from the farthest upstream and downstream points where the wetlands and non-wetland areas of Source 1 would discharge into Herring Run (PPE_{1A} and PPE_{1B}) and Moore's Run (PPE_{1C} and PPE_{1D}). From PPE_{1A}, Herring Run flows in a southeasterly direction for approximately 1.5 miles until it discharges into the Back River. From the farthest upstream PPE in Moore's Run (PPE_{1C}), the in-water segment continues in Moore's Run in a southeasterly direction for approximately 0.53 mile until it discharges into Herring Run. From this point, Herring Run flows in a southeasterly direction for approximately 0.71 mile until it becomes the Back River (Figures 4, 5, and 6, which can be found in Appendix A). The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

<u>Source 2</u>

Prior to landfilling, this source was covered with PEM wetlands, with an unnamed tributary to Herring Run flowing through these wetlands (Ref. 81, Figure 3). The majority of these wetlands were filled-in with landfilled materials. A wetland area, two streams and a pond remain in the center of Source 2 (Ref. 20; Ref. 81, Figure 8). Overland runoff from Source 2 flows from the topographic high where wastes were deposited, toward the center of the source, where wetlands, two streams, and a pond are located. The PPE of overland flow from Source 2 is the wetland area located in the center of Source 2 (PPE_2). These wetlands would discharge into the two streams and the pond located in this area. The two streams located here flow through these wetlands. One of the streams, located to the west, is not directly associated with the pond. The stream located to the east originates from a discharge point at the southeastern end of the pond. The streams flow southeast through the surrounding wetlands and converges to form one stream. The in-water segment for the 15-mile TDL for Source 2 is measured from the northern most point where the wetlands would discharge into the unnamed stream located to the east. This stream continues to flow for approximately 0.23 mile to the southeast until it discharges into Herring Run (Ref. 20) (Figure 4, 5, and 6, which can be found in Appendix A). Herring Run flows in an easterly direction for about 1 mile until it discharges into the Back River. The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

Source 3

Prior to landfilling, the entire area of Source 3 was covered in E2EM wetlands located within Herring Run; therefore the PPE is into these wetlands (Ref. 81, p. 15 and Figure 3). Because the entire source is located in surface waters, the in-water segment of the surface water pathway TDL was determined from the farthest upstream and downstream points where the island would discharge into Herring Run (PPE_{3A}, PPE_{3B}, PPE_{3C}, and PPE_{3D}). From the northern portion of the source, Herring Run flows from the farthest upstream PPEs (PPE_{3A} and PPE_{3B}) for about 0.5 mile to the southeast before discharging into the Back River (Figures 5 and 6, which can be found in Appendix A). The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

Source 4

Prior to landfilling, the entire area of Source 4 was covered in PSS/FO wetlands located adjacent to Redhouse Run; therefore the PPE of hazardous substances from Source 4 is in these wetlands. (Ref. 81, Figure 3). The in-water segment of the surface water TDL was determined from a point on Redhouse Run adjacent to Source 4 (PPE_4). From the PPE in Redhouse Run (PPE_4) the stream flows to the southeast for approximately 0.25 mile until it discharges into Herring Run. Herring Run flows for about 0.70 mile until it discharges into the Back River (Figures 5 and 6, which can be found in Appendix A). The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

Source 5

Prior to landfilling the majority of Source 5 was covered in E2EM wetlands located adjacent to Herring Run; therefore the PPE of hazardous substances from Source 5 into surface waters is in these wetlands (Ref. 81, Figure 3). Two unnamed tributaries to Herring Run flow through Source 5. One of the tributaries originates in the western section of Source 5, flows to the south and eventually flows in an north-eastwardly direction prior to discharging into Herring Run. A second intermittent tributary flows through the southern portion of Source 5, eventually joining the first tributary (Ref. 20; Ref. 41; Ref. 42; Ref. 43). The in-water segment of the surface water pathway TDL was measured from three different starting points: 1) the point determined to be where the wetlands would discharge into the unnamed tributary located on Source 5 (PPE_{5A}); 2) the most upstream point in Herring Run where the Source 5 wetlands would discharge (PPE_{5B}); and 3) the most downstream point in Herring Run where the Source 5 wetlands would discharge (PPE_{5C}). From PPE_{5A} the unnamed tributary flows for approximately 2,640 feet until it discharges into Herring Run. From this point, Herring Run flows for approximately 1.2 mile until it enters the Back River. From the PPE farthest upstream in Herring Run (PPE_{5B}), Herring Run flows in a easterly direction for approximately 0.67 mile until it becomes the Back River (Figures 5 and 6, which can be found in Appendix A). The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

15-mile Target Distance Limit In-Water Segment

The in-water segment of the surface water pathway includes all of the surface water bodies identified downstream of a designated PPE (see Figures 4 and 5 in Appendix A). All of the surface water bodies identified above eventually discharge into Herring Run, before it flows into the Back River. From this point, the Back River flows for approximately 8.5 miles until it discharges into the Chesapeake Bay. The 15-mile surface water pathway TDL ends in the Chesapeake Bay (see Figures 5 and 6 in Appendix A).

Available data indicates that all surface waters located along the 15-mile TDL are tidally influenced (Ref. 16; Ref. 17; Ref. 18; Ref. 62; Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). Data does not exist to document the potential tidal carry of hazardous substances in the area of the site; however, during the April 6 through May 3, 2000 ESI, the sampling team observed and documented the tidal effect on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). During this time period, the uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 18; Ref. 82, Logbook 2, p. 7).

4.1.2.1 LIKELIHOOD OF RELEASE

4.1.2.1.1 Observed Release

<u>Direct Observation</u>

- Basis for Direct Observation

As documented below, Robb Tyler, and at Source 1 Henry Siejack, disposed of waste that contained hazardous substances directly into wetlands that were historically present at Sources 1, 2, 3, 4, and 5. These sources were used for landfilling of wastes from the 1950s through the early 1970s. Historical aerial photographs document that prior to use as landfills, wetland vegetation (PSS/FO, PEM, and E2EM) predominately covered the areas of Sources 1, 2, 3, 4, and 5 (Ref. 81, p. 15 and Figure 3). In addition to the filling of wetlands, 10,215 feet of stream frontage was channelized due to the dumping of wastes (Ref. 6, pp. 10 and 11 through 13; Ref. 81, p. 15). Additional evidence for the direct observation of hazardous substances into wetlands is provided by a photograph taken in 1955 that shows waste oil being dumped into a pit at Source 5, wetland vegetation is visible directly adjacent to the pit. A second photograph taken at the 68th Street Dump site also shows wetland vegetation directly behind a large pile of waste materials and drums (Ref. 92).

The documentation that wastes were deposited directly into surface waters at Sources 1 and 5 is further documented in MD DHMH inspection reports. Specifically, an inspection report dated January 7, 1955 documents that wastes were being deposited at Source 1 along a tributary of Herring Run, causing this tributary to dam up. The report further notes that "heavy pollution" in the form of an oil slick was observed entering this tributary (Ref. 8, p. 29). The inspectors also noted an "exceedingly large amount of barrels" strewn haphazardly on the landfill surface and a pit (measuring approximately 30 by 50 feet), that was being used for disposal of waste oil (Ref. 8, p. 29). An April 1955 inspection report of Source 1 documents that oil seepage from the pit was observed on the ground (Ref. 8, p. 32). Oil placed in this pit and another pit was deposited directly above "natural earth" (Ref. 8, p. 33). A MD DHMH inspection of Source 5 conducted in June 1956 described the dumping of wastes at this time as occurring "at a place where high ground slopes steeply down to a tidal marsh" (Ref. 8, p. 44). On the slope a large pit was observed where waste oil was being dumped. The pit was located "down near the water" and contained oil at the time of the inspection (Ref. 8, p. 44). Wastes were being dumped out into the marsh to dike Herring Run and allow for more dumping to occur in the area formerly occupied by wetlands (Ref. 8, p. 44). Also, the fill material reportedly contacted the water along much of the original shoreline. The inspector noted that "in places the fill has imparted a black deoxygenated look to the water" (Ref. 8, p. 2; Ref. 44, pp. 14 through 29). One such place was near the oil pit (Ref. 8, p. 44).

An inspection conducted in December of 1956 further describes the oil pit located on Source 5. According to the foreman at the site, this pit was constructed for the deposition of oil sludge from the Standard Oil Company Refinery (Ref. 40). Seepage out of the oil pit and into the surrounding marsh was observed at this time along with an oil slick on the water adjacent to the pit. A second pit was also noted during this inspection that contained oil and drained into the marsh from one end (Ref. 40). Evidence of these pits was observed on aerial photographs taken in 1957. This photograph shows a lagoon (noted as LG-1) located on Source 5 that contained dark-toned standing liquid (Ref. 12, pp. 16 and 17). A deposition from a truck driver that hauled waste for Robb Tyler from the 1950s to 1979 provides further documentation of the existence of pits located at Source 5 for the disposal of sludges and paint wastes. Waste disposed of into these pits were reportedly generated from General Motors, Signode Steel, O'Brien

Paint, and Thompson's Wire. According to his deposition, there were two pits located at Source 5. The deponent testified that the size of the pits to be "two or three hundred yards around it" (Ref. 83, pp. 5, 9, 10, 15, 17, 18, 19, 21, 28, 29, 48, 64, 65, 66, 69).

Further documentation of disposal of hazardous wastes directly into the wetlands of Source 5 is documented by a 1979 inspection completed by the Maryland Department of Natural Resources, Water Resources Administration. This inspection uncovered drums containing a gray-green solid dumped into a ravine located in wetlands (Ref. 41; Ref. 43; Ref. 45; Ref. 52, pp. 5, 6, 108). The review of historical aerial photographs taken during this time period also document that the area where these drums and associated wastes were disposed of was wetlands (Ref. 12, pp. 23, 24, and 25). A reinspection of the area where these drums were dumped in 1980 revealed leachate in the stream bed located at the edge of this drum disposal area (Ref. 42).

On June 28, 1984, an inspector from the Maryland Department of Natural Resources, Water Resources Administration observed an oil seep emerging from the bank of the unnamed tributary that flows through Source 5. In MDE file information, the location of this seep was depicted on Baltimore County Tax Map parcel 16 (Ref. 47 and Ref. 53). This oil seep was again observed during an MD WMA reconnaissance in 1985. At this time, the seep was observed to still be leaching oil into the stream from an embankment adjacent to the stream (Ref. 15, p. 3; Ref. 48).

Interviews conducted of former employees and waste haulers associated with the 68th Street Dump further document that the hazardous wastes disposed of at the site were deposited directly into surface waters and wetlands. A testimony provided by a former foreman at the 68th Street Dump site indicated that "waste materials disposed of at the 68th Street Dump site were dumped in swamp areas, and then were covered up" (Ref. 10, p. 161). Another testimony indicated that on a weekly basis for a period of ten years, drummed paint waste generated by General Motors was poured onto the ground in the wetlands area of the site (Ref. 10, p. 4). Dumping by Henry Siejack at Source 1 reportedly occurred at night into holes dug into the ground, near water. The water level would rise when the tide would come in, covering over the waste (Ref. 10, pp. 169 and 179).

All five sources documented at the 68th Street Dump site are located adjacent to surface waters (Herring Run, Moore's Run, Redhouse Run, and an unnamed tributary to Herring Run that flows through Source 2). Source 3 actually forms an island within Herring Run. These sources are all located within the 100-year flood plain in an area (Baltimore County) that has been nationally identified as an area that suffers severe losses due to floods (Ref. 86; Ref. 88, p. 3). Major floods have occurred in Baltimore County in October 1954, August 1955, August 1971, June 1972, and September 1975 (Ref. 64, p. 7; Ref. 87, p. 4). One of the most damaging floods recorded in the Baltimore area occurred on August 1 through 2, 1971. The flood waters recorded in the Back River basin were equivalent to, or in excess of, the 100-year flood interval (Ref. 87, p. 7). A second major flood occurred in Baltimore during Hurricane Agnes, from June 21 through 23 1972. Flood peaks greater than 100-year intervals were recorded in Baltimore at this time (Ref. 87, p. 7). Because the entire area of Sources 1, 2, 3, 4, and 5 are located within the identified 100-year flood zone, the waste that contained hazardous substances, which documentation indicates was disposed of at these sources, was in direct contact with these flood waters. The National Climatic Data Center (NCDC) has documented several, more recent storm events (June 1996, September 1999, and July 14, 2000) that have caused flash flooding in the area where the 68th Street Dump site is located (Ref. 63). In 1996, Hurricane Fran produced stream flows in Maryland among the highest ever seen and in 1999 heavy downpours (4.77 inches fell in the space of a few hours) led to major flooding in the Baltimore area (Ref. 89, p.1; Ref. 90, p. 1). Analytical results from samples collected adjacent to Herring Run, Moore's Run, and Redhouse Run from Sources 1, 2, 3, 4, and 5 in 1985, 1986, 1993, 1994 and in April 2000 document that hazardous substances were present at these sources during these flash flood events (see Figures 2 and 3 in Appendix A). Additional evidence that the area of the 68th Street Dump is prone to flash floods is provided by observations of the banks of Herring Run and Moore's Run. The banks of these streams adjacent to the 68th Street Dump site show evidence of the increase in flow due to storm events (Ref. 15, p. 5; Ref. 18; Ref. 68; Ref. 69; Ref. 76). Exposed landfilled materials have been observed in Herring Run due to erosion of its bank (Ref. 69).

- Hazardous Substances in the Release

According to written reports, Robb Tyler and, at Source 1 Henry Siejack, dumped large amounts of industrial waste at the 68th Street Dump site (Ref. 4, pp. 6 through 15; Ref. 8, p. 20; Ref. 9, pp. 5 and 13; Ref. 12, p. 27; Ref. 23; Ref. 56; Ref. 57). Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump site. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of waste was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156 and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that covered all five source areas located at the site during the 1950s and 1960s (Ref. 81, Figures 4 and 5).

Information is available for some of the generators of wastes disposed of at the site. The generators, wastestreams, and hazardous substances documented in these wastestreams have been summarized in Table 1 in Appendix B. Interviews of former waste haulers indicate that wastes from most of these generators were likely disposed of at all five of the sources that comprise the site. Drivers were told where to dump their waste by the scale house operator or bulldozer operator after arrival at the dump (Ref. 10, pp.13, 14, 23, 24, 32, 44, 66, 113, 121, 124, 134 and 154). The analysis of aerial photographs documents that from the late 1950s through 1968, dumping of wastes was occurring into the wetlands of all five sources (Ref. 81, p. 15 and Figures 3 through 7). Hazardous substances contained in wastestreams disposed of at sources on the 68th Street Dump site include metals, solvents, PAHs, pesticides, and PCBs (see Table 1 in Appendix B for a complete list of substances).

As detailed in the following paragraphs, documentation that wastes containing hazardous substances were disposed of into the wetlands of Sources 1, 2, 3, 4, and 5 is also provided by laboratory analytical results. Samples were collected from drums, seeps and soils at the sources, and from wetlands that remain at Sources 1, 2, and 5.

Drum Sampling Results

- Source 1

Samples of the contents of the drums observed by the MD WMA at Source 1 in 1985 were collected and analyzed for EP toxicity metals (Ref. 8, pp. 3, 59, 95 through 105). Analytical results indicated the presence of hexavalent chromium and lead concentrations above EP toxic levels (Ref. 8, pp. 3, 59, 95, 97, 98, 103, 104, and 105). These results document that waste characterized as hazardous based on its toxicity characteristic were disposed of at Source 1.

- Source 3

Documentation that the materials deposited in the wetlands of Source 3 contained hazardous substances is provided by analytical results of samples collected from drums discovered at the source. MD WMA completed a reconnaissance of Source 3 in February 1985. Numerous drums were observed embedded in the ground at this time (Ref. 8, p. 3). MD WMA collected samples from four of these drums. The samples were analyzed for total metals, purgeable halocarbons (using EPA Method 601), and purgeable aromatics (using EPA Method 602) (Ref. 8, p. 59 and pp. 113 through 121). The table below summarizes the results for the laboratory analysis of these samples.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Toluene	IE 002A	200	8, p. 114
	IE 004A	2,800,000	8, p. 120
Ethylbenzene	IE 002A	310	8, p. 114
	IE 004A	16,780,000	8, p. 120
Xylenes	IE 002A	270	8, p. 114
	IE 004A	92,270,000	8, p. 120
Total Purgeable Halocarbons	IE 002A	4,000	8, p. 114
Metals		**(mg/kg)**	
Arsenic	IE 001B	7.46	8, p. 112
	IE 005B	21.9	8, p. 124
Cadmium	IE 001B	0.89	8, p. 112
	IE 002B	89.8	8, p. 115
	IE 005B	6.03	8, p. 124
Chromium	IE 001B	48.3	8, p. 112
	IE 002B	1,855	8, p. 115
	IE 005B	217	8, p. 124
Copper	IE 005B	97.3	8, p. 124

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Lead	IE 002B	8,105	8, p. 115
Nickel	IE 001B	2,759	8, p. 112
	IE 002B	781	8, p. 115
	IE 004B	24.7	8, p. 121
Zinc	IE 001B	51,232	8, p. 112
	IE 002B	817	8, p. 115
	IE 003B	245	8, p. 118

Notes:

mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Samples of material from drums found at Source 3 were also collected by EPA Region 3's TAT during an emergency response at Source 3 in July 1985. The samples were analyzed for VOCs. The table below summarizes the results of the analysis of these samples.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Acetone	Station #1	3,100 J	21, p. 1
	Station #4	7,700	21, p. 4
	Station #6	33,000	21, p. 7
Benzene	Station # 2	68,000	21, p. 2
	Station #6	26,000	21, p. 7
2-Butanone	Station #5	3,100	21, p. 5
	Station #6	6,000	21, p. 7
1,1-Dichloroethane	Station #2	1,400 J	21, p. 2
Toluene	Station # 1	90,000	21, p. 1
	Station #2	>1,400,000	21, p. 2
	Station #4	41,000	21, p. 4
1,1,1-Trichloroethane	Station #4	8,700	21, p. 4
	Station #5	1,600	21, p. 5
	Station #6	13,000	21, p. 7
1,1,1-Trichloroethane	Station #2	10,000	21, p. 2
Trichloroethylene	Station #2	730 J	21, p. 2
Ethylbenzene	Station # 2	>6,000,000	21, p. 2
	Station #3	1,300	21, p. 3
	Station #4	15,000	21, p. 4
	Station #5	2,800	21, p. 5

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Xylenes	Station #1	150,000	21, p. 1
	Station #3	6,800	21, p. 3
	Station #4	80,000	21, p. 4
	Station #5	14,000	21, p. 5
	Station #6	18,000	21, p. 7

Notes:
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise

Forty drums were removed from Source 3 during an EPA emergency response (Ref. 29, p. 2; Ref. 30, p. 5). According to persons present during the drum removal, the generator of the drums removed was General Motors. Further evidence that the drums originated from General Motors included "dashboard cut-outs" buried with the drums (Ref. 84, p. 18). General Motors actively disposed of wastes at the 68th Street Dump Site from 1962 to 1972 (Ref. 84, pp. 10 through 18). At this time Source 3 was covered in E2EM wetlands (Ref. 81, p. 15, Figure 5).

- Source 4

During a photographic survey conducted by MD WMA on June 22, 1984, three 55-gallon drums were observed protruding from the ground at Source 4 (Ref. 32; Ref. 33). After the discovery of the drums MD WMA returned to Source 4 on June 28, 1984 to complete an investigation of the area. At this time it was determined that one of the estimated ten drums found at the source was full. Analytical results from a sample of the drum contents determined that the full drum contained paint sludge (Ref. 32). Robb Tyler's son, Alfred Tyler, the owner of the property at the time, secured the removal of 10 drums from Source 4 in July 1984 (Ref. 8, p. 2; Ref. 9, p. 5; Ref. 32; Ref. 33; Ref. 35).

- Source 5

Samples were also collected from drums encountered at Source 5. Drums of waste that were dumped into a ravine located within the wetlands of Source 5 contained large amounts of zinc (48.6%) (Ref. 41; Ref. 43). Analysis of a sample of the waste material revealed a zinc concentration of 486,000 ppm (Ref. 41). In addition, laboratory analysis of the contents of the drums determined the waste to be classified as hazardous because the concentrations of lead and cadmium exceeded EP Toxicity levels (Ref. 44). The unnamed tributary to Herring Run flows from north to south through this area (Ref. 20). A sample of this stream near this disposal area revealed a zinc concentration of 500 ppm in the stream (Ref. 41). Additional evidence of the hazardous substances released into the surrounding environment from this area of Source 5 is obtained from analytical results from monitoring wells. In 1981, four monitoring wells were installed by the MD Department of Health and Mental Hygiene. Ground water elevation readings indicated that ground water was flowing in a northeast direction, towards Herring Run. Analytical results from ground water samples collected from an upgradient background well revealed an average zinc concentration of 0.84 milligrams per liter (mg/L); an average cadmium concentration of 0.01 mg/L; and an average lead concentration of 0.31 mg/L. Results from ground water samples collected from a monitoring well installed in the drum disposal area indicated a zinc concentration of 1,015.0 mg/L; a cadmium concentration of 0.56 mg/L; and a lead concentration of 3.8 mg/L. The zone of ground water contamination from this area was determined to extend at least 100 feet downgradient towards Herring Run (Ref. 44).

Seep Sampling

- Source 5

On March 13, 1985 MD WMA collected a sample of the oil-like substance that was observed at Source 5 entering an unnamed tributary to Herring Run. The sample was analyzed for PCBs by the State of Maryland's Hazardous Waste Laboratory. Analytical results indicated a PCB concentration of 90,000 µg/kg. A second sample of the substance entering the stream was collected on April 16, 1985; the PCB concentration in this sample was 84,000 µg/kg. A third sample was collected from the soils in the embankment where the oil seep appeared to be originating from; this soil sample had a PCB concentration of 5,500 µg/kg (Ref. 15, pp. 3, 24, and 99; Ref. 47; Ref. 48; Ref. 53).

Samples Collected In Areas Historically Covered In Wetlands

Further evidence that hazardous substances were deposited directly into the wetlands of Sources 1, 2, 4, and 5 is provided by laboratory analytical results of sampling events conducted at these sources. Samples were collected in 1986 by EPA FIT, in 1989 by MD WMA, in 1993 and 1994 by MDE, and in 2000 by the EPA Region 3 SATA team. Analytical results for the samples are provided as evidence of hazardous substance deposition into wetlands because the samples were collected at Sources 1, 2, 4, and 5 in locations documented by historical aerial photographs to have at one time been covered in wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 6, pp. 6 through 15; Ref. 81). The waste disposed of at these sources has not been removed; therefore, the analytical results summarized in the tables below document the hazardous substances present in the waste that was directly deposited into the wetlands of Sources 1, 2, 4, and 5.

EPA FIT Sample Results - 1986

- Source 4

The EPA Region 3 FIT collected four samples from Source 4 during an SI conducted in 1986. Soil sample C9223/MC4964 was collected from soils where drums were removed in 1984, soil sample C9249/MC4962 was collected from a pile of fly ash (generated from the Baltimore Gas and Electric incinerator) located northwest of the former Robb Tyler office building, sample C9248/MC4950 was collected from soils determined by BFI to exhibit the characteristic of reactivity, and C9250/MC4963 was collected from a drainage ditch that intersects Herring Run (Ref. 13, pp. Section 6 and Figure 3; Ref.14, pp. 2, 8, 14, 15, and 16). The samples collected during the SI were analyzed for organic and inorganic parameters by an EPA CLP laboratory. The analytical results for these samples are shown in the table below. No background samples were collected during the SI; therefore, the metal concentrations detected in the samples have been compared to the concentrations in the background sample collected by the EPA Region 3 SATA team during the ESI completed in 2000.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL* (µg/kg)	Reference
Organics				
Bis(2-ethylhexyl) phthalate	C9223	611,129 J	330	13, p. 6-5
	C9249	7,656 J	330	13, p. 6-5
	C9250	10,388 J	330	13, p. 6-5
Pyrene	C9223	9,140 J	330	13, p. 6-5
	C9250	4,427 K	330	13, p. 6-5
Phenanthrene	C9250	2,938 J	330	13, p. 6-5
Chrysene	C9250	3,166 J	330	13, p. 6-5
Fluoranthene	C9223	1,644 K	330	13, p. 6-5

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL* (mg/kg)	Reference
Metals					
Aluminum	MC4962	31,250	8,800	200	13, p. 6-6; 7, pp. 12 and 87
Arsenic	MC4950	13	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	45	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4964	26	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
Cadmium	MC4950	6.7	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4963	1.45	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	38	ND	1	13, p. 6-6; 7, pp. 12 and 87
Chromium	MC4950	260	27	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	280	27	2	13, p. 6-6; 7, pp. 12 and 87
Copper	MC4950	338	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4962	4,490	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4964	690	33.7	5	13, p. 6-6; 7, pp. 12 and 87
Lead	MC4950	622	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4962	2,850	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4964	1,960	101	0.6	13, p. 6-6; 7, pp. 12 and 87
Mercury	MC4950	3.2	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	0.8	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
Nickel	MC4962	1,100	16.3	8	13, p. 6-7; 7, pp. 12 and 87
	MC4964	64	16.3	8	13, p. 6-7; 7, pp. 12 and 87
Zinc	MC4950	790	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4962	23,900	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4964	1,760	142	4	13, p. 6-7; 7, pp. 12 and 87

Notes:

*	The SQL cannot be determined with the available data.
CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
ND	Not detected above the detection limit
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
K	Analyte present; reported value may be biased high
L	Analyte present; reported value may be biased low

MD WMA Sample Results - 1989

- Source 5

MD WMA collected samples from Source 5 during an SI conducted in 1989. All samples were analyzed in accordance with EPA CLP protocols for TCL organics and TAL metals analysis (Ref. 52, Vol. I, p. 13). Analytical results for the samples are summarized in the table below. One sample (SS-6) was collected outside the influence of the site to establish background concentrations of metals (Ref. 52, Vol. I, p. 108). These background concentrations have been used to determine the significance of metals detected at Source 5.

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Butylbenzylphthalate	SS-1	3,000	485	52, Vol. I, p. 66; Vol. II, p. 150; 79
Aroclor-1254	SS-1	480	235	52, Vol. I, p. 66; Vol. II, p. 151; 79
Fluroanthene	SS-1	150 J	485	52, Vol. I, p. 66; Vol. II, p. 150; 79
Bis(2-ethylhexyl)phthalate	SS-1	360 J	485	52, Vol. I, p. 66; Vol. II, p. 150; 79
Benzo(k)fluoranthene	SS-1	140 J	485	52, Vol. I, p. 66; Vol. II, p. 150; 79
Fluoranthene	SS-4	430	384	52, Vol. I, p. 66; Vol. II, p. 164; 79
Pyrene	SS-4	510	384	52, Vol. I, p. 66; Vol. II, p. 164; 79
Bis(2-ethylhexyl)phthalate	SS-4	430	384	52, Vol. I, p. 66; Vol. II, p. 164; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background (SS-6)	CRDL* (mg/kg)	Reference
Metals					
Zinc	SS-2	2,500	333	4	52, Vol. I, p. 82

Notes:

SQL Sample quantitation limit, calculations shown in reference 79
* The SQL cannot be calculated with the available data.
CRDL Contract-required detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

MDE Sample Results - 1993

In 1993, the MDE collected samples from Sources 1, 2, and 4. The area where these samples were collected was in an area historically covered in PSS/FO and PEM wetlands (Ref. 81, pp. 5, 15 and Figure 3). These samples were analyzed in accordance with CLP protocols (Ref. 9, pp. 18, 20, and 47). Two samples, Soil-5 and Soil-6, were collected to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of the metals detected at Sources 1, 2, and 4. If the metal was detected in both background samples the sample with the higher concentration was used as the comparative sample. The first table below presents the sample with the highest concentration of each hazardous substance detected at Source 1 (for a complete list of all contaminated samples see Section 2.2). The second table presents the results from samples collected from Source 2, and the third table presents the results from samples collected from Source 4.

- Source 1

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Benzo(a)anthracene	Soil-2	910	375	9, pp. 156 and 299; 79
Benzo(b)fluoranthene	Soil-2	1900	375	9, pp. 156 and 299; 79
Chlordane (alpha)	Soil-4	4.2	1.9	9, pp. 156 and 357; 79
Chlordane (gamma)	Soil-3	8.7	2.1	9, pp. 156 and 356; 79
4,4'-DDE	Soil-3	32	4.0	9, pp. 156 and 356; 79
Fluoranthene	Soil-2	2,000	375	9, pp. 156 and 299; 79
Phenanthrene	Soil-2	1,200	375	9, pp. 156 and 299; 79
Pyrene	Soil-2	740	375	9, pp. 156 and 299; 79

Hazardous Substance	Evidence	Concentration* (mg/kg)	Background Concentration (Soil-5 or Soil-6)* (mg/kg)	SQL (mg/kg)	Reference
Metals					
Aluminum	Soil-13	118,000	6,470	48.3	9, pp. 113, 231 and 232; 79
Arsenic	Soil-2	56.2 L	3.9 L (6.79)	2.3	9, pp. 113, 228, 231 and 232; 79
Barium	Soil-13	2,250	74.1	48.3	9, pp. 113, 229, 231 and 232; 79
Cadmium	Soil-3	101	ND	1.3	9, pp. 113, 229, 231 and 232; 79
Chromium	Soil-13	299 J (231.8)	29.3 J (37.8)	2.4	9, pp. 113, 229, 231 and 232; 79
Copper	Soil-2	5,270	25.8	5.7	9, pp. 113, 229, 231 and 232; 79
Lead	Soil-3	2,680	201 J (289)	0.8	9, pp. 113, 229, 231 and 232; 79
Manganese	Soil-3	2,060 J (1661)	240 J (297.6)	3.8	9, pp. 113, 229, 231 and 232; 79
Mercury	Soil-1	1.8	0.28	0.1	9, pp. 113, 229, 231 and 232; 79
Nickel	Soil-2	121	ND	9.1	9, pp. 113, 229, 231 and 232; 79
Selenium	Soil-3	10.4 L	ND	6.3	9, pp. 113, 229, 231 and 232; 79
Silver	Soil-3	12.6	ND	2.5	9, pp. 113, 229, 231 and 232; 79
Zinc	Soil-3	4,560	77.0	5.0	9, pp.113, 229, 231 and 232; 79

Notes:

*	All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram
ND	Not detected above the SQL
SQL	Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
L	Analyte present; reported value may be biased low
[ ]	Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

- Source 2

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Dieldrin	Soil-15	960 J	440	9, p. 168;79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Cadmium	Soil-15	10.8	ND	2.3	9, pp. 111, 113, 214, 231 and 232; 79
Chromium	Soil-15	417	29.3 J	4.6	9, pp. 111, 113, 214, 231 and 232; 79
Copper	Soil-15	798	25.8	11.5	9, pp. 111, 113, 214, 231 and 232; 79
Lead	Soil-15	723	201 J	1.38	9, pp. 111, 113, 214, 231 and 232; 79
Mercury	Soil-15	14.6	0.28	0.23	9, pp. 111, 113, 214, 231 and 232; 79
Nickel	Soil-15	25.1	[6.1]	18.4	9, pp. 111, 113, 214, 231 and 232; 79
Silver	Soil-15	47.3	ND	4.6	9, pp. 111, 113, 214, 231 and 232; 79
Zinc	Soil-15	658	77.0	9.2	9, pp. 111, 113, 214, 231 and 232;79

Notes:

CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

- Source 4

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Anthracene	Soil-11	4,000	2,037	9, pp. 159 and 313; 79
Benzo(a)anthracene	Soil-11	11,000 J	2,037	9, pp. 159 and 313; 79
Benzo(b)fluoranthene	Soil-11	20,000 J+	10,185	9, pp. 159 and 315; 79
Benzo(a)pyrene	Soil-11	8,800 J	2,037	9, pp. 159 and 313; 79
Benzo(g,h,i)perylene	Soil-11	3,800 J	2,037	9, pp. 159 and 313; 79
Bis(2-ethylhexyl)phthalate	Soil-11	72,000 +	10,185	9, pp. 159 and 315; 79
Carbazole	Soil-11	2,600	2,037	9, pp. 159 and 313; 79
Chrysene	Soil-11	8,500 J	2,037	9, pp. 159 and 313; 79
Chlordane (alpha)	Soil-11	58J	10.4	9, pp. 167 and 362; 79
Fluoranthene	Soil-11	20,000 +	10,185	9, pp. 159 and 315; 79
Indeno(1,2,3-cd)-pyrene	Soil-11	4,200 J	2,037	9, pp. 159 and 313; 79
Phenanthrene	Soil-11	14,000 +	2,037	9, pp. 159 and 315; 79
Pyrene	Soil-11	13,000 J	2,037	9, pp. 159 and 313; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Arsenic	Soil-11	33.8 L	3.9 L	2.5	9, pp. 110, 113, 211, 231 and 232; 79
Cadmium	Soil-11	6.3	ND	1.3	9, pp. 110, 113, 211, 231 and 232; 79
Copper	Soil-11	467	25.8	6.3	9, pp. 110, 113, 211, 231 and 232; 79
Lead	Soil-11	1,530	201 J	0.8	9, pp. 110, 113, 211, 231 and 232; 79
Mercury	Soil-11	0.85	0.28	0.13	9, pp. 110, 113, 211,231 and 232; 79
Nickel	Soil-11	224	ND	10	9, pp. 110, 113, 211, 231 and 232; 79
Silver	Soil-11	17.5	ND	2.5	9, pp. 110, 113, 211, 231 and 232; 79
Zinc	Soil-11	1,520	77.0	5.0	9, pp. 110, 113, 211, 231 and 232; 79

Notes:

SQL Sample quantitation limit, calculations provided in reference 79
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
L Analyte present; reported value may be biased low
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
\+ Results taken from diluted sample

MDE Sample Results - 1994

MDE returned to Source 4 in 1994 to collect soil samples from 3 locations(Ref. 60, p. 2). The samples were analyzed in accordance with EPA CLP protocols for TCL organic and TAL inorganic parameters (Ref. 60, pp. 8 and 9; Ref. 61).

Hazardous Substance	Evidence	Concentration (µg/kg)	AQL (µg/kg)	Reference
1,2,4-Trimethylbenzene	S-5	475	179	61, pp. 17, 19 and 27
Naphthalene	S-5	281,000	165	61, pp. 17, 19 and 27
Benzo(b)fluoranthene	S-2	15,000	82.5	61, pp. 17, 19 and 27
Benzo(a)anthracene	S-5	90,000 J	165	61, pp. 17, 19 and 27
Benzo(a)pyrene	S-5	55,000 J	165	61, pp. 17, 19 and 27
Benzo(g,h,i)perylene	S-5	42,000	165	61, pp. 17, 19 and 27
Benzo(k)fluoranthene	S-5	95,000 J	165	61, pp. 17, 19 and 27
Bis(2-ethyhexyl)phthalate	S-5	45,000	165	61, pp. 17, 19 and 27
Buthylbenzylphthalate	S-2	22,000	82.5	61, pp. 17, 19 and 27
Carbazole	S-5	82,000 J	165	61, pp. 17, 19 and 27
Chrysene	S-2	8,200	82.5	61, pp. 17, 19 and 27
Dibenzofuran	S-5	76,000 J	165	61, pp. 17, 19 and 27
Fluoranthene	S-5	80,000 J	165	61, pp. 17, 19 and 27
Fluorene	S-5	70,000 J	165	61, pp. 17, 19 and 27
Indeno(1,2,3-cd)pyrene	S-5	55,000 J	165	61, pp. 17, 19 and 27
2-methylnaphthalene	S-5	132,000 J	165	61, pp. 17, 19 and 26
Aroclor-1260	S-2	564	82.5	61, pp. 17, 18 and 25

Notes:
- AQL Actual quantitation limit
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise

EPA SATA Team Sample Results - 2000

Finally, analytical results from samples collected as part of the ESI conducted in 2000 by the EPA SATA team provides further documentation of the hazardous substances disposed of into the wetlands of Sources 1, 2, 4, and 5. These samples were collected from locations documented by historical aerial photographs to have at one time been covered with wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 12, pp. 14 through 29; Ref. 81). Sampling locations are provided in Figures 2 and 3 in Appendix A. These samples were analyzed for organic and inorganic parameters using CLP laboratory protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples analyzed for inorganic analysis were analyzed for total metals. To identify metal concentrations exceeding background levels, the metal concentrations detected at Source 1 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12). Only select analytical results are provided in the table below (for a complete list of all contaminated samples collected from Sources 1, 2, 4, and 5, see Section 2.2, Source Characterization).

- Source 1

Hazardous Substance	Evidence	Concentration * (µg/kg)	SQL (µg/kg)	Reference
Organics				
2-Methylnaphthalene	ORLF-WS26B	9,300	825	7, p. 114; 79
	ORLF-WS19B	190,000	11,579	7, p. 110; 79
4-Chloroaniline	ORLF-WS26B	18,000	825	7, p. 114; 79
4-Methylphenol	ORLF-WS10B	4,800	943	7, p. 108; 79
4-Nitroaniline	ORLF-WS26B	32,000	2075	7, p. 115; 79
Acenaphthene	ORLF-WS20B	11,000	8,354	7, p. 112; 79
	ORLF-WS26B	20,000	825	7, p. 114; 79
Anthracene	ORLF-WS20B	9,300	8,354	7, p. 113; 79
	ORLF-WS26C	52,000	15,865	7, p. 115; 79
Benzo(a)anthracene	ORLF-WS26C	140,000 +	63,461	7, p. 115; 79
Benzo(b)fluoranthene	ORLF-WS01B	1,100	412.5	7, p. 107; 79
	ORLF-WS26C	150,000 +	63,461	7, p. 115; 79
Benzo(k)fluoranthene	ORLF-WS05B	1,100	795.2	7, p. 107; 79
	ORLF-WS26A	3,200	2,012	7, p. 115; 79
Benzo(g,h,i)perylene	ORLF-WS26C	33,000	15,865	7, p. 115; 79
Benzo(a)pyrene	ORLF-WS05B	1,100	795.2	7, p. 107; 79
	ORLF-WS26C	120,000	15,865	7, p. 115; 79
bis(2-Ethylhexyl)phthalate	CPLF-WS05B	49,000	10,061	7, p. 129; 79
	ORLF-WS19B	82,000	11,579	7, p. 111; 79

Hazardous Substance	Evidence	Concentration * (µg/kg)	SQL (µg/kg)	Reference
Butylbenzylphthalate	ORLF-WS20B	7,900	4,177.2	7, p. 113; 79
	CPLF-WS08B	13,000	825	7, p. 131; 79
Carbazole	ORLF-WS26B	19,000	825	7, P. 115; 79
	ORLF-WS20B	4,700	4,177.2	7, p. 113; 79
Chrysene	ORLF-WS01B	1,100	412.5	7, p. 107; 79
	ORLF-WS26C	120,000	15,865	7, p. 115; 79
4,4-DDD	ORLF-WS18B	150 +	41.25	7, p. 118; 79
4,4-DDT	ORLF-WS18B	360 J (28.1)	4.125	7, p. 118; 79
Dibenzofuran	ORLF-WS26B	22,000	825	7, p. 115; 79
	ORLF-WS20B	9,000	4,177.2	7, p. 113; 79
Dibenz(a,h)anthracene	ORLF-WS26C	20,000	15,865	7, p. 115; 79
Di-n-butylphthalate	ORLF-WS10B	19,000 +	471.4	7, p. 109; 79
	CPLF-WS08B	3,400	825	7, p. 131; 79
Fluoranthene	ORLF-WS20B	17,000	63,461	7, p. 113; 79
	ORLF-WS26C	340,000	15,865	7, p. 115; 79
Fluorene	ORLF-WS11B	1,200	569	7, p. 109; 79
	ORLF-WS20B	14,000	4,177.2	7, p. 113; 79
gamma-Chlordane	ORLF-WS20A	42 +	10.6	7, p. 118; 79
	ORLF-WS28B	170 + J (17)	36.2	7, p. 120; 79
Hexachlorocyclopentadiene	CPLF-WS08B	1,600 J (160)	825	7, p. 130; 79
Indeno(1,2,3-cd)-pyrene	ORLF-WS26C	39,000	15,865	7, p. 115; 79
	ORLF-WS20B	560 J (56)	4,177.2	7, p. 113; 79
Naphthalene	CPLF-WS08B	2,700	825	7, p. 130; 79
	ORLF-WS18B	160,000	4,125	7, p. 110; 79
Phenanthrene	ORLF-WS26C	160,000 +	63,461	7, p. 115; 79
	ORLF-WS20B	42,000 +	8,354	7, p. 113; 79
Pyrene	ORLF-WS26C	250,000 +	63,461	7, p. 115; 79
	ORLF-WS20B	13,000	4,177	7, p. 113; 79
Aroclor-1232	CPLF-WS05B	15,000 +J (1,500)	201	7, p. 132; 79
	ORLF-WS01B	3,300 + J (330)	412.5	7, p. 116; 79
Aroclor-1242	CPLF-WS08D	3,300 +J (330)	209	7, p. 133; 79
Aroclor-1254	CPLF-WS06B	500	80.5	7, p. 133; 79
	ORLF-WS01B	2,700 +	412.5	7, p. 116; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration* (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	ORLF-WS08B	326 L	ND	16.3	7, pp. 12, 38, 87; 79
	ORLF-WS25B	419 L	ND	16.0	7, pp. 12, 41, 87; 79
Arsenic	ORLF-WS09B	35.9 L	4.3 L (7.48)	2.6	7, pp. 12, 38, 87; 79
Barium	ORLF-WS07B	1,500	118	60.8	7, pp. 12, 37, 87; 79
Cadmium	ORLF-WS09B	8.4	ND	1.3	7, pp. 12, 38, 87; 79
	ORLF-WS20A	5.7	ND	1.3	7, pp. 12, 40, 87; 79
Chromium	CPLF-WS08D	483 L	27	2.5	7, pp. 12, 46, 87; 79
	ORLF-WS20A	359	27	2.5	7, pp. 12, 40, 87; 79
Copper	CPLF-WS04B	249	33.7	5.8	7, pp. 12, 45, 87; 79
	ORLF-WS20A	349	33.7	6.3	7, pp. 12, 40, 87; 79
Lead	ORLF-WS19B	2,760	101	1.1	7, pp. 12, 39, 87; 79
	ORLF-WS27B	3,730	101	0.7	7, pp. 12, 41, 87; 79
Manganese	ORLF-WS09B	4,350 L	487	3.9	7, pp. 12, 38, 87; 79
	ORLF-WS18B	6,050	487	4.0	7, pp. 12, 39, 87; 79
Mercury	ORLF-WS20A	2.6	0.18	0.1	7, pp. 12, 40, 87; 79
	ORLF-WS25B	1.6	0.18	0.1	7, pp. 12, 41, 87; 79
Nickel	CPLF-WS08C	615	16.3	10.5	7, pp. 12, 46, 87; 79
	ORLF-WS20B	211	16.3	10.1	7, pp. 12, 40, 87; 79
Silver	ORLF-WS28B	8.6	ND	4.9	7, pp. 12, 41, 87; 79
Zinc	ORLF-WS07B	2,050 L	142	6.1	7, pp. 12, 37, 87; 79
	ORLF-WS04B	2,690 L	142	5.5	7, pp. 12, 37, 87; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above SQL
SQL Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
L Analyte present; reported value may be biased low
\+ Results reported from diluted sample

- Source 2

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
1,1'-Biphenyl	HSLF-WS15B	550 J	4,388	7, p. 95; 79
2-Methylnaphthalene	HSLF-WS12B	180,000	155,327	7, p. 95; 79
Acenaphhthene	HSLF-WS15B	4,800	4,388	7, p. 95; 79
Anthracene	HSLF-WS15B	6,700	4,388	7, p. 96; 79
Benzo(a)anthracene	HSLF-WS15B	12,000	4,388	7, p. 96; 79
Benzo(b)fluoranthene	HSLF-WS15B	8,100	4,388	7, p. 96; 79
Benzo(k)fluoranthene	HSLF-WS15B	9,700	4,388	7, p. 96; 79
Benzo(a)pyrene	HSLF-WS15B	11,000	4,388	7, p. 96; 79
Benzo(g,h,i)perylene	HSLF-WS15B	2,800 J	4,388	7, p. 96; 79
Butylbenzylphthalate	HSLF-WS15B	4,400	4,388	7, p. 96; 79
Carbazole	HSLF-WS03B	2,400 J	4,388	7, p. 94; 79
Chrysene	HSLF-WS15B	12,000	4,388	7, p. 96; 79
Dibenzofuran	HSLF-WS03B	3,000 J	12,011	7, p. 94; 79
	HSLF-WS15B	3,800 J	4,388	7, p. 96; 79
Dibenz(a,h)anthracene	HSLF-WS15B	1,700 J	4,388	7, p. 96; 79
2,4-Dimethylphenol	HSLF-WS12B	6,000 J	155,327	7, p. 95; 79
Fluoranthene	HSLF-WS15B	19,000	4,388	7, p. 96; 79
Fluorene	HSLF-WS15B	4,800	4,388	7, p. 96; 79
gamma-chlordane	HSLF-WS01A	32	2.3	7, p. 97; 79
Indeno(1,2,3-cd)-pyrene	HSLF-WS01A	1,200	895	7, p. 94; 79
Phenanthrene	HSLF-WS15B	19,000	4,388	7, p. 96; 79
Pyrene	HSLF-WS15B	17,000	4,388	7, p. 96; 79
Aroclor-1242	HSLF-WS07C	1,300 + J	242.6	7, p. 97; 79
Aroclor-1254	HSLF-WS07C	520 J	48.5	7, p. 97; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	HSLF-WS09B	23.1 L	ND	19.4	7, pp. 12, 33, 87; 79
Arsenic	HSLF-WS03B	76.6	4.3 L	2.97	7, pp. 12, 32, 87; 79
Barium	HSLF-WS07C	582	118.0	66.9	7, pp. 12, 32, 87; 79
Cadmium	HSLF-WS09C	203,000 +J	ND	1.3	7, pp. 12, 33, 87; 79
Chromium	HSLF-WS07C	175	27	3.3	7, pp. 12, 32, 87; 79
Copper	HSLF-WS02B	667	33.7	5.9	7, pp. 12, 32, 87; 79
Lead	HSLF-WS07B	3,740 J	101	0.9	7, pp. 12, 32, 87; 79
Mercury	HSLF-WS03B	4.5	0.18	0.14	7, pp. 12, 32, 87; 79
Nickel	HSLF-WS07C	211	16.3	13.4	7, pp. 12, 32, 87; 79
Silver	HSLF-WS09B	8.6 K	ND	3.2	7, pp. 12, 33, 87; 79
Zinc	HSLF-WS03B	10,800	142	5.9	7, pp. 12, 32, 87; 79

Notes:

SQL Sample quantitation limit, calculation provided in reference 79
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
\+ Reported value result of diluted sample

- Source 4

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
2-Methylnaphthalene	BLFWS-02B	630	559	7, p. 165; 79
Anthracene	BLF-SS02	1,200 J	1,919	7, p. 166; 79
Benzo(a)anthracene	BLF-SS02	4,400	1,919	7, p. 166; 79
Benzo(b)fluoranthene	BLF-SS02	6,000	1,919	7, p. 166; 79
Benzo(k)fluoranthene	BLF-SS02	3,200 J	1,919	7, p. 166; 79
Benzo(a)pyrene	BLF-SS02	5,000	1,919	7, p. 166; 79
Benzo(g,h,i)perylene	BLF-SS02	2,000	1,919	7, p. 166; 79
bis(2-Ethylhexyl)phthalate	BLFWS-02B	30,000	559	7, p. 166; 79
Chrysene	BLF-SS02	4,700	1,919	7, p. 166; 79
Fluoranthene	BLF-SS02	11,000	1,919	7, p. 166; 79
Indeno(1,2,3-cd)-pyrene	BLF-SS02	1,900	1,919	7, p. 166; 79
Phenanthrene	BLF-SS02	5,100	1,919	7, p. 166; 79
Pyrene	BLF-SS02	7,700	1,919	7, p. 166; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Barium	BLFWS-04B	802	118.0	282	7, pp. 12, 60, 87
Cadmium	BLFWS-03B	13.9	ND	1.3	7, pp. 12, 60, 87
Chromium	BLFWS-02B	77.2	27	2.7	7, pp. 12, 60, 87
Copper	BLFWS-01B	3,200 J	33.7	7.9	7, pp. 12, 60, 87
Lead	BLFWS-03B	2,710	101	0.78	7, pp. 12, 60, 87
Mercury	BLFWS-03A	0.64	0.18	0.1	7, pp. 12, 60, 87
Nickel	BLFWS-03B	91.6	16.3	10.4	7, pp. 12, 60, 87
Silver	BLFWS-01B	4.5 L	ND	3.2	7, pp. 12, 60, 87
Zinc	BLFWS-01B	2,290	142	6.3	7, pp. 12, 60, 87

Notes:

SQL Sample quantitation limit, calculation provided in reference 79
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
L Analyte present; reported value may be biased low
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
\+ Results reported from diluted sample

- Source 5

Hazardous Substance	Evidence	Concentration* (μg/kg)	SQL (μg/kg)	Reference
Organics				
Acenaphthene	UCLF-WS04B	10,000	2,426	7, p. 139; 79
Anthracene	UCLF-WS04B	11,000	2,426	7, p. 140; 79
Benzo(a)anthracene	UCLF-WS04B	18,000	2,426	7, p. 140; 79
Benzo(b)fluoranthene	UCLF-WS04B	11,000 +	1,213	7, p. 140; 79
Benzo(k)fluoranthene	UCLF-WS04B	6,800	12,132	7, p. 140; 79
Benzo(a)pyrene	UCLF-WS04B	17,000	2,426	7, p. 140; 79
Benzo(g,h,i)perylene	UCLF-WS04B	7,000	2,426	7, p. 140; 79
bis(2-Ethylhexyl)phthalate	UCLF-WS11B	440,000 +	67,808	7, p. 144; 79
Butylbenzylphthalate	UCLF-WS13B	77,000	15,277.8	7, p. 144; 79
Carbazole	UCLF-WS04B	2,700	2,426	7, p. 140; 79
4-Chlorophenyl-phenyl Ether	UCLF-WS04B	12,000	2,426	7, p. 140; 79
Chrysene	UCLF-WS04B	19,000	2,426	7, p. 140; 79
Dibenzofuran	UCLF-WS04B	9,700	2,426	7, p. 140; 79
Dibenz(a,h)anthracene	UCLF-WS04B	3,700	2,426	7, p. 140; 79
Di-n-butylphthalate	UCLF-WS10B	6,400 J (640)	6,470.6	7, p. 144; 79
Fluoranthene	UCLF-WS04B	38,000 +	12,132	7, p. 140; 79
Indeno(1,2,3-cd)-pyrene	UCLF-WS04B	7,500	2,426	7, p. 140; 79
2-Methylnaphthalene	UCLF-WS04B	4,100	2,426	7, p. 139; 79
Naphthalene	UCLF-WS09B	350,000	733	7, p. 141; 79
n-Nitroso-di-n-propylamine	UCLF-WS04B	25,000 +	12,132	7, p. 139; 79
Phenanthrene	UCLF-WS04B	50,000 +	12,132	7, p. 140; 79
Phenol	UCLF-WS02B	3,800	2,845	7, p. 139; 79
Pyrene	UCLF-WS04B	30,000 +	12,132	7, p. 140; 79
Aroclor-1242	UCLF-WS02B	1,600 J (160)	56.9	7, p. 145; 79
Aroclor-1254	UCLF-WS06C	1,400 J (140)	246	7, p. 146; 79
Aroclor-1260	UCLF-WS06B	6,500 +	846	7, p. 146; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A)* (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	UCLF-WS14B	37.2	ND	25.3	7, pp. 12, 52, 87; 79
Arsenic	IELF-WS03C	51.6	4.3 L (7.48)	2.8	7, pp. 12, 55, 87; 79
Barium	UCLF-WS11B	3,290 +	118.0	54.1	7, pp. 12, 52, 87; 79
Beryllium	UCLF-WS06B	1.8	[0.76]	1.4	7, pp. 12, 51, 87; 79
Cadmium	UCLF-WS11B	9.6	ND	1.4	7, pp. 12, 52, 87; 79
Chromium	UCLF-WS06B	1,660	27	2.8	7, pp. 12, 51, 87; 79
Copper	UCLF-WS08B	5,240 J (4,295)	33.7	7.0	7, pp. 12, 51, 87; 79
Lead	UCLF-WS11B	4,720 J (3,277.8)	101	0.8	7, pp. 12, 52, 87; 79
Manganese	UCLF-WS05A	13,300 +	487	33.9	7, pp. 12, 50, 87; 79
Mercury	UCLF-WS09B	6.5	0.18	0.2	7, pp. 12, 51, 87; 79
Nickel	UCLF-WS08B	446	16.3	19.6	7, pp. 12, 51, 87; 79
Silver	UCLF-WS12B	10.8	ND	2.6	7, pp. 12, 52, 87; 79
Zinc	UCLF-WS13B	5,200 K (3,467)	142	7.1	7, pp. 12, 52, 87; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations presented in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
\+ Results reported from diluted sample

EPA SATA Team Wetland Sample Results - 2000

Although the majority of the wetlands documented to have at one time existed at Sources 1, 2 and 5 have been lost due to landfilling, a few wetland areas remain (Ref. 81, see Figures 7 and 8 in Appendix A). Documentation that waste containing hazardous substances were deposited directly into wetlands at Sources 1, 2 and 5 is documented by the laboratory analysis of samples collected from wetlands that remain at these sources. The table below summarizes the samples collected during the 2000 ESI from these wetlands. These samples were analyzed under EPA's CLP (Ref. 7, p. 1). To identify metal concentrations exceeding background levels, the metal concentrations detected in these wetland samples were compared to the analytical results from a sediment sample collected from a wetland located outside the influence of the site. This sample was collected in a wetland area located along Herring Run, upstream of the 68th Street Dump site. The sample was collected by the EPA Region 3 START in February 2001 and was analyzed for the same parameters as the samples collected from Sources1, 2 and 5 (TCL organics and TAL metals by an EPA CLP laboratory) (Ref. 65). All sampling locations are shown on Figures 2 and 3 in Appendix A.

Hazardous Substance	Evidence	Source No.	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics					
Fluoranthene	MRWT-SD01	1	830	598.9	7, p. 221; 79
	ORWT-SD04	1	630	460.1	7, p. 221; 79
	HRWT-SD03	1	1,700	956	7, p. 223; 79
	BRWT-SD06	5	1,700 J (170)	589.3	7, p. 223; 79
Phenanthrene	BRWT-SD06	5	800 J (80)	589.3	7, p. 223; 79
Pyrene	MRWT-SD01	1	890	598.9	7, p. 221; 79
	ORWT-SD04	1	560	598.8	7, p. 221; 79
	HRWT-SD03	1	1,500	956	7, p. 223; 79
	BRWT-SD06	5	1,400 J (140)	589.3	7, p. 223; 79
Benzo(a)anthracene	BRWT-SD06	5	780 J (78)	589.3	7, p. 223; 79
Chrysene	BRWT-SD06	5	1,100 J (110)	589.3	7, p. 223; 79
bis(2-Ethylhexyl)phthalate	BRWT-SD06	5	1,300 J (130)	589.3	7, p. 223; 79
Benzo(b)fluoranthene	BRWT-SD06	5	1,200 J (120)	589.3	7, p. 223; 79
Benzo(k)fluoranthene	BRWT-SD06	5	740 J (74)	589.3	7, p. 223; 79
Benzo(a)pyrene	BRWT-SD06	5	920 J (92)	589.3	7, p. 223; 79
alpha-Chlordane	MRWT-SD01	1	36	3.15	7, p. 224; 79
	ORWT-SD03	1	12	2.58	7, p. 224; 79
	HRWT-SD02	1	34 J (3.4)	3.43	7, p.225; 79
	HSLF-SD01	2	11	6.23	7, p. 101; 79
	HSLF-SD02	2	22	6.23	7, p. 101; 79
	BRWT-SD06	5	9.2 J (.92)	3.03	7, p. 225; 79

Hazardous Substance	Evidence	Source No.	Concentration* (µg/kg)	SQL (µg/kg)	Reference
gamma-Chlordane	MRWT-SD01	1	33	3.15	7, p. 224; 79
	HRWT-SD02	1	38 J (3.8)	3.15	7, p. 224; 79
	HSLF-SD01	2	10	6.23	7, p. 101; 79
	BRWT-SD06	5	8.4 J (.84)	3.03	7, p. 225; 79
	IELFWT-SD02	5	5.4	4.2	7, p. 224; 79
Aroclor-1260	ORWT-SD03	1	240	50	7, p. 224; 79
	ORWT-SD04	1	130 J (13)	46	7, p. 224; 79
	HRWT-SD01	1	130 J (13)	79.7	7, p. 224; 79

Hazardous Substance	Evidence	Source	Concentration * (mg/kg)	Background Concentration (SED-01) (mg/kg)	SQL (mg/kg)	Reference
Metals						
Arsenic	ORWT-SD03	1	4.6 J (2.6)	ND	3.07	7, p. 83; 65, p. 5; 79
	ORWT-SD04	1	3.7 J (2.1)	ND	2.8	7, p. 83; 65, p. 5; 79
Chromium	ORWT-SD03	1	154	21.6	3.1	7, p. 83; 65, p. 5; 79
	ORWT-SD04	1	75.1	21.6	2.8	7, p. 83; 65, p. 5; 79
	ORWT-SD05	1	72.1	21.6	2.8	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	83.3	21.6	5.11	7, p. 83; 65, p. 5; 79
	HSLF-SD01	2	133 L	21.6	8.1	7, p. 34; 79
	HSLF-SD02	2	123 L	21.6	9.7	7, p. 34; 79
	IELFWT-SD02	5	76.5	21.6	5.3	7, p. 83; 65, p. 5; 79
Copper	ORWT-SD03	1	111	28.5	7.7	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	102	28.5	12.8	7, p. 83; 65, p. 5; 79
	HSLF-SD01	2	116	28.5	20.1	7, p. 34; 79
	HSLF-SD02	2	117	28.5	24.1	7, p. 34; 79
Lead	MRWT-SD01	1	218	49.8	1.29	7, p. 83; 65, p. 5; 79
	ORWT-SD03	1	365	49.8	0.92	7, p. 83; 65, p. 5; 79
	ORWT-SD04	1	170	49.8	0.84	7, p. 83; 65, p. 5; 79
	ORWT-SD05	1	214	49.8	0.84	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	287	49.8	1.53	7, p. 83; 65, p. 5; 79
	HSLF-SD01	2	418 J (290)	49.8	2.4	7, p. 34; 79
	HSLF-SD02	2	456 J (317)	49.8	2.9	7, p. 34; 79
	IELFWT-SD02	5	204	49.8	1.58	7, p. 83; 65, p. 5; 79
	BRWT-SD06	5	154	49.8	1.22	7, p. 84; 65, p. 5; 79
Mercury	ORWT-SD03	1	0.36	[0.12] K	0.3	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	0.29 B	[0.12] K	0.3	7, p. 83; 65, p. 5; 79

SWOF - Observed Release
Direct Observation

Hazardous Substance	Evidence	Source	Concentration * (mg/kg)	Background Concentration (SED-01) (mg/kg)	SQL (mg/kg)	Reference
Nickel	ORWT-SD03	1	56.9	15.8	12.3	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	49.1	15.8	20.5	7, p. 83; 65, p. 5; 79
	HSLF-SD01	2	60.7	15.8	32.3	7, p. 34; 79
	HSLF-SD02	2	70.0	15.8	38.6	7, p. 34; 79
Zinc	MRWT-SD01	1	323	75.1	8.62	7, p. 83; 65, p. 5; 79
	ORWT-SD03	1	464	75.1	6.13	7, p. 83; 65, p. 5; 79
	IELFWT-SD02	5	726	75.1	10.6	7, p. 83; 65, p. 5; 79
	HRWT-SD01	1	420	75.1	10.2	7, p. 83; 65, p. 5; 79
	HRWT-SD02	1	267	75.1	8.3	7, p. 83; 65, p. 5; 79
	HSLF-SD01	2	914	75.1	16.1	7, p. 34; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release

__Chemical Analysis__

In addition to the documentation presented for each individual source, an observed release by chemical analysis can be documented by comparing analytical results for samples collected from Herring Run downstream of the five sources identified at the 68th Street Dump site, to analytical results for sediment samples collected upstream of the sources. The background sediment sample chosen to document conditions upstream of the 68th Street Dump site is HR-SD03. Another upstream sample, HR-SD02, was collected during the ESI above where five or six stormwater outfalls discharge into Herring Run. The sample, HR-SD03 was collected downstream of where these outfalls discharged (Ref. 82, Logbook 2, p. 7). The sample HR-SD02, was determined to not be a suitable background sample because of difficulties encountered by the laboratory during the analysis of this sample. The sample had to be diluted prior to analysis, resulting in a very high sample quantitation limit (SQL) (Ref. 91). The estimated concentrations and number of hazardous substances reported in HR-SD02 was less than the concentrations and number of hazardous substances reported in HR-SD03; therefore, using HR-SD03 as the background sample presents the most conservative approach to scoring the surface water pathway (Ref. 7, p. 178).

The ESI sampling team conducted sampling activities at the site from April 6 through May 3, 2000, during this time period tidal effect was observed on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 18; Ref. 82, Logbook 2, p. 7). The background sample HR-SD03 was collected above the point of the observed upstream extent of tidal effect in Herring Run (Figure 2, which can be found in Appendix A).

In addition to the background sediment samples collected in Herring Run, to fully evaluate the affect of the other surface water bodies that flow through the site and drain into Herring Run, the Moore's Run and Redhouse Run background samples collected during the 2000 ESI have also been included for comparison. As documented in the tables below, the background sediment samples, HR-SD03, RHRSD-01 and MR-SD02 were collected during the same sampling event, using the same protocols, and within the same urban environment as the release samples. A second upstream sediment sample (MR-SD01) was collected in Moore's Run during the ESI. This sample does not meet the criteria as an appropriate background sample because it was collected in an area where an oil sheen was observed and would therefore not accurately reflect the ambient background concentrations of hazardous substances in Moore's Run (Ref. 82, Logbook 2, pp. 5 and 6). Only samples that are located in Herring Run downstream of all five sources that comprise the 68th Street Dump were used to document the observed release for the entire 68th Street Dump site. All sampling locations are shown in Figures 2 and 3 in Appendix A. Observed releases by chemical analysis for Sources 1, 2, 4, and 5 have also been individually documented and can be found in Appendices C, D, F, and G.

Chemical Analysis

- Background Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
HR-SD03	Herring Run	0-6	4/7/00	7, p. 19; 18; 82, Logbook 2, pp. 7 and 9
MR-SD02	Moore's Run	0-6	4/7/00	7, p. 21; 18; 82, Logbook 2, pp. 6 and 9
RHRSD-01	Redhouse Run	0-6	4/7/00	7, p. 21; 18; 82, Logbook 1, p. 5 and Logbook 2, p. 39

- Background Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
HR-SD03	Benzo(a)anthracene	ND	434.2	7, p. 178; 79
	Benzo(k)fluoranthene	ND	434.2	7, p. 178; 79
	Benzo(a)pyrene	ND	434.2	7, p. 178; 79
MR-SD02	Benzo(a)anthracene	ND	418	7, p. 200; 79
	Benzo(k)fluoranthene	ND	418	7, p. 200; 79
	Benzo(a)pyrene	ND	418	7, p. 200; 79
RHRSD-01	Benzo(a)anthracene	ND	407.4	7, p. 214; 79
	Benzo(k)fluoranthene	ND	407.4	7, p. 214; 79
	Benzo(a)pyrene	ND	407.4	7, p. 214; 79
Metals		**mg/kg**	**SQL (mg/kg)**	
HR-SD03	Lead	38.6 B	0.89	7, p. 66; 79
	Zinc	79.4 B	6.0	7, p. 66; 79
MR-SD02	Lead	10.6 B	0.77	7, p. 74; 79
	Zinc	35.6 B	5.1	7, p. 74; 79
RHRSD-01	Lead	18.1 B	0.78	7, p. 80; 79
	Zinc	51.8	5.2	7, p. 80; 79

Notes:

µg/kg Micrograms per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; calculation provided in reference 79

Analytical Data Qualifiers:

B Not detected substantially above the level reported in laboratory or field blanks

- Release Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
BR-SD03	Herring Run	0-6	4/26/00	7, p. 20; 18; 82, Logbook 2, p. 27
BR-SD04	Herring Run	0-6	4/26/00	7, p. 20; 18; 82, Logbook 2, p. 27
BR-SD06	Herring Run	0-6	5/2/00	7, p. 20; 18; 82, Logbook 2, p. 33

- Release Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
BR-SD03	Benzo(a)anthracene	650	508	7, p. 207; 79
	Benzo(k)fluoranthene	620	508	7, p. 207; 79
	Benzo(a)pyrene	680	508	7, p. 207; 79
Metals		**mg/kg**	**SQL (mg/kg)**	
BR-SD03	Lead	123	1.1	7, p. 77; 79
BR-SD04	Lead	181	1.1	7, p. 77; 79
	Zinc	464 L	7.4	7, p. 77; 79
BR-SD06	Lead	171	1.1	7, p. 77; 79
	Zinc	327	7.4	7, p. 77; 79

Notes:

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
SQL Sample quantitation limit; calculation provided in reference 79

Analytical Data Qualifiers:

L Analyte present; reported value may be biased low

Attribution:

As documented in the source description sections and in the observed release section, waste containing hazardous substances was disposed of at all five sources that comprise the 68th Street Dump site. These wastes were disposed of in the wetlands that at one time predominately covered the 68th Street Dump site. None of the sources were contained to prevent hazardous substances from migrating from these wetlands and into the adjacent surface water bodies. The hazardous substances detected in the downstream release samples were also detected at elevated concentrations at all five sources, documenting that the release of these hazardous substances is at least partially attributable to the five sources identified at the 68th Street Dump site.

Other potential sources of hazardous substances into Herring Run and the Back River include numerous stormwater outfalls located along Herring Run, a pile of Herring Run dredge sediments located adjacent to Herring Run, and the effect of the tidal influence noted in the area. Analytical results of samples collected from the three stormwater outfalls that discharge into Herring Run indicate that these outfalls are an additional source of hazardous substances into Herring Run. The concentrations of most of the hazardous substances detected in these outfalls was significantly less than the concentrations detected at the sources that comprise the 68th Street Dump site. The only exception was the concentration of zinc reported in outfall sample, HROF-SD06. This concentration (15,000 mg/kg), was comparable to the concentrations detected in source samples (Ref. 7, pp. 69 and 184). The location of these outfalls is shown on Figure 2 in Appendix A.

Analytical results are also available for the pile of Herring Run sediments that were dredged from the stream and stockpiled across from Source 1, adjacent to Herring Run (Figure 2, which can be found in Appendix A). These samples were collected during the EPA ESI conducted in 2000 and were identified by the prefix "BCQ". The concentrations of hazardous substances reported in these samples was significantly less than the concentrations reported for the same hazardous substances detected in samples collected from the sources that comprise the 68th Street Dump site (Ref. 7, pp. 48, 135 through 137).

Finally, the potential tidal carry of hazardous substances that may be present downstream of the 68th Street Dump site in Herring Run or the Back River cannot be satisfactorily established; however, it has been documented that the hazardous substances detected in samples collected downstream of the 68th Street Dump site were also detected at elevated concentrations in samples collected from all five sources that comprise the site; therefore, although there are other potential sources of hazardous substances into Herring Run, the 68th Street Dump site has been shown to be partially attributable to the elevated concentrations of hazardous substances detected in downstream sediment samples.

Hazardous Substances in the Release

Benzo(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Lead
Zinc

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

All five sources that comprise the 68th Street Dump site have surface water containment values greater than zero; therefore, all of the hazardous substances detected at the five sources are presented in the table below.

Hazardous Substance	Source No.	Toxicity Value	Persistence Value	Toxicity/ Persistence Factor Value	Ref.
1,1'-Biphenyl	1, 2, 5	10	0.4	4	2, p. B-3
2-Butanone	3	NL[a]	NL[a]	–	2
4-Chloroaniline	1	1,000	0.07	70	2, p. B-5
1,1-Dichloroethane	3	10	0.4	4	2, p. B-7
2,4-Dimethylphenol	2,4	100	1.0	100	2, p. B-8
2,6-Dinitrotoluene	5	1,000	0.4	400	2, p. B-9
2-Methylnaphthalene	1,2,4,5	NL[a]	0.4	–	2, p. B-14
2-Methylphenol	5	NL[a]	NL[a]	–	2
4-Methylphenol	1,4	NL[a]	NL[a]	–	2
4-Nitroaniline	1	1	0.4	0.4	2, p. B-14
2-Nitrophenol	5	1	1.0	1	2, p. B-15
1,1,1-Trichloroethane	3	1	0.4	0.4	2, p. B-19
1,1,1-Trichloroethene	3	10	0.4	4	2, p. B-19
1,2,4-Trimethylbenzene	4	NL[a]	NL[a]	–	2
Acetone	3	10	0.4	4	2, p. B-1
Acenaphthene	1,2,4,5	10	0.4	4	2, p. B-1
Aluminum	1	NL[a]	1.0	–	2, p. B-1
Anthracene	1,2,3,5	10	1.0	10	2, p. B-2
Antimony	1,2,3,5	10,000	1.0	10,000	2, p. B-2
Arsenic	1,2,3,4,5	10,000	1.0	10,000	2, p. B-2
Barium	1,2,3,4,5	10,000	1.0	10,000	2, p. B-2
Benzene	3	100	0.4	40	2, p. B-2
Benzo(a)anthracene	1,2,3,4,5	1,000	1.0	1,000	2, p. B-2
Benzo(a)pyrene	1,2,3,4,5	10,000	1.0	10,000	2, p. B-2
Benzo(b)fluoranthene	1,2,3,4,5	1,000	1.0	1,000	2, p. B-3
Benzo(g,h,i)perylene	1,2,3,4,5	NL[a]	1.0	–	2, p. B-3
Benzo(k)fluoranthene	1,2,3,4,5	100	1.0	100	2, p. B-3

Hazardous Substance	Source No.	Toxicity Value	Persistence Value	Toxicity/ Persistence Factor Value	Ref.
Beryllium	5	10,000	1.0	10,000	2, p. B-3
Bis(2-chloroethoxy)methane	5	100	1.0	100	2, p. B-3
Bis(2-ethylhexyl)phthalate	1,2,4,5	100	1.0	100	2, p. B-3
Butylbenzylphthalate	1,2,4,5	10	1.0	10	2, p. B-4
Cadmium	1,2,3,4,5	10,000	1.0	10,000	2, p. B-4
Carbazole	1,2,4,5	10	0.4	4	2, p. B-4
Chlordane (alpha)	1,4	10	1.0	10	2, p. B-4
Chlordane (gamma)	1,4,5	10	1.0	10	2, p. B-4
Chromium	1,2,3,4,5	10,000	1.0	10,000	2, p. B-5
Chrysene	1,2,3,4,5	10	1.0	10	2, p. B-5
Copper	1,2,3,4,5	NL[a]	1.0	–	2, p. B-6
DDD	1	100	1.0	100	2, p. B-6
DDE	1	100	1.0	100	2, p. B-6
DDT	1	1,000	1.0	1,000	2, p. B-6
Di-n-butylphthalate	1,5	10	1.0	10	2, p. B-7
Dibenzo(a,h)anthracene	1,2,4,5	10,000	1.0	10,000	2, p. B-7
Diethylphthalate	5	1	1.0	1	2, p. B-8
Dibenzofuran	1,2,4,5	NL[a]	1.0	–	2, p. B-7
Dieldrin	1,2	10,000	1.0	10,000	2, p. B-8
n-Nitroso-di-n-propylamine	5	10,000	0.0007	7	2, p. B-14
Ethylbenzene	3,5	10	0.4	4	2, p. B-10
Fluoranthene	1,2,3,4,5	100	1.0	100	2, p. B-10
Fluorene	1,2,4,5	100	1.0	100	2, p. B-10
Hexachlorocyclopentadiene	1	10,000	1.0	10,000	2, p. B-12
Indeno(1,2,3-cd)pyrene	1,2,3,4,5	1,000	1.0	1,000	2, p. B-12
Lead	1,2,3,4,5	10,000	1.0	10,000	2, p. B-13
Manganese	1,2,3,4,5	10,000	1.0	10,000	2, p. B-13
Mercury	1,2,3,4,5	10,000	0.4	4,000	2, p. B-13
Napththalene	1,4,5	100	0.4	40	2, p. B-14
Nickel	1,2,3,4,5	10,000	1.0	10,000	2, p. B-14
N-Nitrosodiphenylamine	5	10	1.0	10	2, p. B-15

Hazardous Substance	Source No.	Toxicity Value	Persistence Value	Toxicity/ Persistence Factor Value	Ref.
PCBs	1,2,4,5	10,000	1.0	10,000	2, p. B-16
Phenol	1,5	1	1.0	1	2, p. B-16
Phenanthrene	1,2,3,4,5	NL[a]	1.0	–	2, p. B-16
Pyrene	1,2,3,4,5	100	1.0	100	2, p. B-17
Silver	1,2,4,5	100	1.0	100	2, p. B-17
Selenium	1	100	1.0	100	2, p. B-17
Toluene	3,5	10	0.4	4	2, p. B-19
Trichloroethylene	3	10	0.4	4	2, p. B-19
Xylene, total	3,5	1	0.4	0.4	2, p. B-20
Zinc	1,2,3,4,5	10	1.0	10	2, p. B-20

Notes:

[a] NL = This hazardous substance is not listed in the Superfund Chemical Data Matrix (SCDM).
[b] NA = A factor value for this hazardous substance cannot be calculated because the substance is not listed in SCDM.

Highest Toxicity/Persistence Value = 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
2	Horseshoe Landfill	20.1	No
3	Island Landfill	7.56	No
4	Redhouse Run Landfill	5.77	No
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**180.83**	

Hazardous Waste Quantity Factor Value = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 32

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Presented below are the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at the five sources that comprise the 68th Street Dump site.

Hazardous Substance	Source No.	Toxicity Value	Persistence Value*	Toxicity/ Persistence Factor Value	Human Food Chain Bioaccumu-lation Value**	Toxicity/ Persistence/ Bioaccumu-lation Factor Value	Ref.
1,1'-Biphenyl	1,2,5	10	0.4	4	500	2,000	2, p. B-3
2-Butanone	3	NL[a]	NL[a]	–	NL[a]	–	2
4-Chloroaniline	1	1,000	0.07	70	5.0	350	2, p. B-5
1,1-Dichloroethane	3	10	0.4	4	5.0	20	2, p. B-7
2,4-Dimethylphenol	2,4	100	1.0	100	500	$5x10^4$	2, p. B-8
2,6-Dinitrotoluene	5	1,000	0.4	400	5.0	2,000	2, p. B-9
2-Methylnaphthalene	1,2,4,5	NL[a]	0.4	–	5,000	–	2, p. B-14
2-Methylphenol	5	NL[a]	NL[a]	–	NL[a]	–	2
4-Methylphenol	1,4	NL[a]	NL[a]	–	NL[a]	–	2
4-Nitroaniline	1	1	0.4	0.4	5.0	2	2, p. B-14
2-Nitrophenol	5	1	1.0	1	5.0	5	2, p. B-15
1,1,1-Trichloroethane	3	1	0.4	0.4	5.0	2	2, p. B-19
1,1,1-Trichloroethene	3	10	0.4	4	50	200	2, p. B-19
1,2,4-Trimethylbenzene	4	NL[a]	NL[a]	–	NL[a]	–	2
Acetone	3	10	0.4	4	0.5	2	2, p. B-1
Acenaphthene	1,2,4,5	10	0.4	4	500	2,000	2, p. B-1
Aluminum	1	NL[a]	1.0	–	50	–	2, p. B-1
Anthracene	1,2,4,5	10	1.0	10	5000	$5x10^4$	2, p. B-2
Antimony	1,2,4,5	10,000	1.0	10,000	0.5	5,000	2, p. B-2
Arsenic	1,2,3,4,5	10,000	1.0	10,000	5.0	$5x10^4$	2, p. B-2
Barium	1,2,3,4,5	10,000	1.0	10,000	0.5	5,000	2, p. B-2
Benzene	3	100	0.4	40	5000	$2x10^5$	2, p. B-2
Benzo(a)anthracene	1,2,3,4,5	1,000	1.0	1,000	50,000	$5x10^7$	2, p. B-2
Benzo(a)pyrene	1,2,3,4,5	10,000	1.0	10,000	50,000	$5x10^8$	2, p. B-2
Benzo(b)fluoranthene	1,2,3,4,5	1,000	1.0	1,000	50,000	$5x10^7$	2, p. B-3

SWOF/Food Chain - Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Toxicity Value	Persistence Value*	Toxicity/ Persistence Factor Value	Human Food Chain Bioaccumulation Value**	Toxicity/ Persistence/ Bioaccumulation Factor Value	Ref.
Benzo(g,h,i)perylene	1,2,3,4,5	NL[a]	1.0	NA[b]	50,000	NA[b]	2, p. B-3
Benzo(k)fluoranthene	1,2,3,4,5	100	1.0	100	50,000	$5x10^6$	2, p. B-3
Beryllium	5	10,000	1.0	10,000	50	$5x10^5$	2, p. B-3
Bis(2-chloroethoxy)methane	5	100	1.0	100	0.5	50	2, p. B-3
Bis(2-ethylhexyl)phthalate	1,4,5	100	1.0	100	50,000	$5x10^6$	2, p. B-3
Butylbenzylphthalate	1,2,4,5	10	1.0	10	500	5,000	2, p. B-4
Cadmium	1,2,3,4,5	10,000	1.0	10,000	5,000	$5x10^7$	2, p. B-4
Carbazole	1,2,4,5	10	0.4	4	500	2,000	2, p. B-4
Chlordane (alpha)	1,4	10	1.0	10	500	5,000	2, p. B-4
Chlordane (gamma)	1,4,5	10	1.0	10	50,000	$5x10^5$	2, p. B-4
Chromium	1,2,3,4,5	10,000	1.0	10,000	5.0	$5x10^4$	2, p. B-5
Chrysene	1,2,3,4,5	10	1.0	10	500	5,000	2, p. B-5
Copper	1,2,3,4,5	NL[a]	1.0	–	50,000	–	2, p. B-6
DDD	1	100	1.0	100	50,000	$5x10^6$	2, p. B-6
DDE	1	100	1.0	100	50,000	$5x10^6$	2, p. B-6
DDT	1	1,000	1.0	1,000	50,000	$5x10^7$	2, p. B-6
Di-n-butylphthalate	1,5	10	1.0	10	5,000	50,000	2, p. B-7
Dibenzo(a,h)anthracene	1,2,4,5	10,000	1.0	10,000	50,000	$5x10^8$	2, p. B-7
Diethylphthalate	5	1.0	1.0	1.0	500	500	2, p. B-8
Dibenzofuran	1,2,4,5	NL[a]	1.0	–	500	–	2, p. B-7
Dieldrin	1,2	10,000	1.0	10,000	50,000	$5x10^8$	2, p. B-8
n-Nitroso-di-n-propylamine	5	10,000	0.0007	7	5.0	35	2, p. B-14
Ethylbenzene	3,5	10	0.4	4	50	200	2, p. B-10
Fluoranthene	1,2,3,4,5	100	1.0	100	5,000	$5x10^5$	2, p. B-10
Fluorene	1,2,4,5	100	1.0	100	5,000	$5x10^5$	2, p. B-10
Hexachlorocyclopentadiene	1	10,000	1.0	10,000	5,000	$5x10^7$	2, p. B-12
Indeno(1,2,3-cd)pyrene	1,2,3,4,5	1,000	1.0	1,000	50,000	$5x10^7$	2, p. B-12
Lead	1,2,3,4,5	10,000	1.0	10,000	50	$5x10^5$	2, p. B-13
Manganese	1,2,3,4,5	10,000	1.0	10,000	0.5	5,000	2, p. B-13
Mercury	1,2,3,4,5	10,000	0.4	4,000	50,000	$2x10^8$	2, p. B-13
Napththalene	1,4,5	100	0.4	40	500	$2x10^4$	2, p. B-14

SWOF/Food Chain - Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Toxicity Value	Persistence Value*	Toxicity/ Persistence Factor Value	Human Food Chain Bioaccumu-lation Value**	Toxicity/ Persistence/ Bioaccumu-lation Factor Value	Ref.
Nickel	1,2,3,4,5	10,000	1.0	10,000	0.5	5,000	2, p. B-14
N-Nitrosodiphenylamine	1	10	1.0	10	500	5,000	2, p. B-15
PCBs	1,2,4,5	10,000	1.0	1,000	50,000	$5x10^7$	2, p. B-16
Phenol	1,5	1	1.0	1	5	5	2, p. B-16
Phenanthrene	1,2,3,4,5	NL[a]	1.0	–	50	–	2, p. B-16
Pyrene	1,2,3,4,5	100	1.0	100	50	5,000	2, p. B-17
Selenium	1	100	1.0	100	5,000	$5x10^5$	2, p. B-17
Silver	1,2,5	100	1.0	100	50	5,000	2, p. B-17
Toluene	3,5	10	0.4	4	50	200	2, p. B-19
Trichloroethylene	3	10	0.4	4	50	200	2, p. B-19
Xylene	3,5	1	0.4	0.4	50	200	2, p. B-20
Zinc	1,2,3,4,5	10	1.0	10	500	5,000	2, p. B-20

Notes:

a No value listed for this hazardous substance in the SCDM.
b Hazardous substance not listed in SCDM; therefore, no factor value can be calculated.
* The persistence value listed for rivers was used.
** The human food chain bioaccumulation value listed for freshwater was used.

Toxicity/Persistence/Bioaccumulation Factor Value = $5x10^8$

4.1.3.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
2	Horseshoe Landfill	20.1	No
3	Island Landfill	7.56	No
4	Redhouse Run Landfill	5.77	No
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**180.83**	

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = 5×10^8

Toxicity/Persistence Factor Value (10,000) × HWQ Value (100) = 1×10^6
1×10^6 × BPFV (5×10^8) = Waste Characteristics Product (5×10^{14}) (subject to maximum value of 1×10^{12})

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

<u>Actual Human Food Chain Contamination</u>

Herring Run is a fishery in the area of the 68th Street Dump site. Electrofishing studies conducted in Herring Run by MDE have determined that carp, gizzard shed, catfish, bullfish, and white suckers are found in these waters (Ref. 16). During the EPA ESI conducted in 2000, the sampling team observed many fish in Herring Run and photographed fishing and turtle nets in Herring Run with fish and turtles caught in them (Ref. 18; Ref. 68). At one time a fishing tournament was held at Cox's Point Park on the Back River, directly downstream from Herring Run. During the tournament, fishermen would travel up Herring Run, usually to the point where the sewer pipe crosses Herring Run (near Source 3). Fish caught during this tournament were donated to a homeless shelter in Baltimore until it was determined by MDE that the fish had six times the concentrations of PCBs recommended for edible fish.. The organizer of the tournament stated that he has seen people fish in Herring Run "many, many times" (Ref. 69; Ref. 71). A Morgan State University biology professor has completed several fish studies on Herring Run in the area of the 68th Street Dump site. He is interested in determining the effects of PAHs on fish. He has sampled fish from the I-95 bridge (Source 1) to the 695 bridge (Source 5). He has often observed evidence, such as nylon fishing line, along Herring Run and Moore's Run in this area. According to his observations, many people fish in Herring Run in the area of the I-95 bridge (near Source 1). He stated that on weekends so many fisherman were parking in a businesses lot in this area that their delivery trucks could not get in (Ref. 76).

<u>Sediment Samples - Herring Run</u>

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. All of the samples shown below are documented in the observed release section, Sections 4.1.2.1.1, and bioaccumulation potential factor values are documented in Section 4.1.3.2.1 of this documentation record.

Sample ID	Hazardous Substance	Sample Concentration* (µg/kg)	Bioaccumulation Value
BR-SD03	Benzo(a)anthracene	650	50,000
	Benzo(k)fluoranthene	620	50,000
	Benzo(a)pyrene	680	50,000
Sample ID	**Hazardous Substance**	**Sample Concentration (mg/kg)**	**Bioaccumulation Value**
Metals			
BR-SD04	Zinc	464 L	500
BR-SD06	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

Analysis of sediment sample BR-SD03 detected three hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) in Herring Run that were also detected in samples collected from all five sources that make up the 68th Street Dump site.

Sample ID:	BR-SD03
Distance from PPE_{1A}:	8,204 feet
Reference:	Figure 2, 3, and 6 in Appendix A

Level II Fisheries - 68th Street Dump site

Hazardous substances that have bioaccumulation potential factor values of 500 or greater were detected in sediment samples collected from Herring Run. The extent of Level II fisheries that can be documented for the 68th Street Dump site includes the distance from PPE_{1A} to sediment sampling location BR-SD03.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	8,204 feet

4.1.3.3.1 Food Chain Individual

A food chain individual factor value of 45 is assigned at the 68th Street Dump site because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances (Ref. 1, Section 4.1.3.3.1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 Level II Concentrations

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Sources 1 through 5 of the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 <u>Potential Human Food Chain Contamination</u>

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is assigned a contamination factor value of greater than zero.

Potential Human Food Chain Contamination Factor Value = >0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Presented below are the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at the five sources that comprise the 68th Street Dump site. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Hazardous Substance	Source No.	Ecosystem Toxicity Value	Persistence Value*	Environmental Bioaccumulation Value**	Ecosystem Toxicity/ Persistence Factor Value**	Ecosystem Toxicity/ Persistence Bioaccum. Factor Value	Ref.
1,1'-Biphenyl	1,2,5	1,000	0.4	500	400	2×10^5	2, p. B-3
2-Butanone	3	NL[a]	NL[a]	NL[a]	–	–	2
4-Chloroaniline	1	10,000	0.07	5.0	700	3,500	2, p. B-5
4-Chlorophenyl-phenyl Ether	5	1,000	1.0	5,000	1,000	5×10^6	2, p. B-5
1,1-Dichloroethane	3	NL[a]	0.4	5.0	–	–	2, p. B-7
2,4-Dimethylphenol	2,4	100	1	500	100	5×10^4	2, p. B-8
2,6-Dinitrotoluene	5	10	0.4	5.0	4	20	2, p. B-9
2-Methylnaphthalene	1,2,4,5	1,000	0.4	5,000	400	2×10^6	2, p. B-14
2-Methylphenol	5	NL[a]	NL[a]	NL[a]	–	–	2
4-Methylphenol	1,4	NL[a]	NL[a]	NL[a]	–	–	2
4-Nitroaniline	1	10	0.4	5.0	4	20	2, p. B-14
2-Nitrophenol	5	100	1.0	5.0	100	500	2, p. B-15
1,1,1-Trichloroethane	3	10	0.4	5.0	4	20	2, p. B-19
1,1,1-Trichloroethene	3	100	0.4	50	40	2,000	2, p. B-19
1,2,4-Trimethylbenzene	4	NL[a]	NL[a]	NL[a]	–	–	2
Acetone	3	100	0.4	0.5	40	20	2, p. B-1
Acenaphthene	1,2,4,5	10,000	0.4	500	4,000	2×10^6	2, p. B-1
Aluminum	1	100	1.0	50	100	5,000	2, p. B-1
Anthracene	1,2,4,5	10,000	1.0	5,000	10,000	5×10^7	2, p. B-2
Antimony	1,2,4,5	100	1.0	5.0	100	500	2, p. B-2
Arsenic	1,2,3,4,5	10	1.0	500	10	5,000	2, p. B-2
Barium	1,2,3,4,5	1.0	1.0	0.5	1	0.5	2, p. B-2
Benzene	3	100	0.4	500	40	2×10^4	2, p. B-2
Benzo(a)anthracene	1,2,3,4,5	10,000	1.0	50,000	10,000	5×10^8	2, p. B-2
Benzo(a)pyrene	1,2,3,4,5	10,000	1.0	50,000	10,000	5×10^8	2, p. B-2
Benzo(b)fluoranthene	1,2,3,4,5	NL[a]	1.0	50,000	–	–	2, p. B-3

Hazardous Substance	Source No.	Ecosystem Toxicity Value	Persistence Value*	Environmental Bioaccumulation Value**	Ecosystem Toxicity/ Persistence Factor Value**	Ecosystem Toxicity/ Persistence Bioaccum. Factor Value	Ref.
Benzo(g,h,i)perylene	1,2,3,4,5	NL[a]	1.0	50,000	–	–	2, p. B-3
Benzo(k)fluoranthene	1,2,3,4,5	NL[a]	1.0	50,000	–	–	2, p. B-3
Beryllium	5	NL[a]	1.0	50	–	–	2, p. B-3
Bis(2-chloroethoxy)methane	5	1.0	1.0	0.5	1.0	0.5	2, p. B-3
Bis(2-ethylhexyl)phthalate	1,4,5	1,000	1.0	50,000	1,000	5×10^{7}	2, p. B-3
Butylbenzylphthalate	1,2,4,5	100	1.0	500	100	5×10^{4}	2, p. B-4
Cadmium	1,2,3,4,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-4
Carbazole	1,2,4,5	NL[a]	0.4	500	–	–	2, p. B-4
Chlordane (alpha)	1,4	10,000	1.0	500	10,000	5×10^{6}	2, p. B-4
Chlordane (gamma)	1,4,5	10,000	1.0	500	10,000	5×10^{6}	2, p. B-4
Chromium	1,2,3,4,5	100	1.0	5.0	100	500	2, p. B-5
Chrysene	1,2,3,4,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-5
Copper	1,2,3,4,5	100	1.0	50,000	100	5×10^{6}	2, p. B-6
DDD	1	10,000	1.0	50,000	10,000	5×10^{8}	2, p. B-6
DDE	1	10,000	1.0	50,000	10,000	5×10^{8}	2, p. B-6
DDT	1	10,000	1.0	50,000	10,000	5×10^{8}	2, p. B-6
Di-n-butylphthalate	1,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-7
Dibenzo(a,h)anthracene	1,2,4,5	NL[a]	1.0	50,000	–	–	2, p. B-7
Diethylphthalate	5	10	1.0	500	10	5,000	2, p. B-8
Dibenzofuran	1,2,3,4,5	100	1.0	500	100	5×10^{4}	2, p. B-7
Dieldrin	1,2	10,000	1.0	50,000	10,000	5×10^{8}	2, p. B-8
n-Nitroso-di-n-propylamine	5	NL[a]	0.0007	5.0	–	–	2, p. B-14
Ethylbenzene	3,5	100	0.4	50	40	2,000	2, p. B-10
Fluoranthene	1,2,3,4,5	10,000	1.0	500	10,000	5×10^{6}	2, p. B-10
Fluorene	1,2,4,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-10
Hexachlorocyclopentadiene	1	10,000	1.0	50	10,000	5×10^{5}	2, p. B-12
Indeno(1,2,3-cd)pyrene	1,2,3,4,5	NL[a]	1.0	50,000	–	–	2, p. B-12
Lead	1,2,3,4,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-13
Manganese	1,2,3,4,5	NL[a]	1.0	50,000	–	–	2, p. B-13
Mercury	1,2,3,4,5	10,000	0.4	50,000	4,000	2×10^{8}	2, p. B-13
Naphthalene	1,4,5	1,000	0.4	500	400	2×10^{5}	2, p. B-14
Nickel	1,2,3,4,5	10	1.0	500	10	5,000	2, p. B-14
N-Nitrosodiphenylamine	5	100	1.0	500	100	5×10^{4}	2, p. B-15
PCBs	1,2,3,4,5	10,000	1.0	50,000	10,000	5×10^{8}	2, p. B-16

SWOF/Environmental-Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Ecosystem Toxicity Value	Persistence Value*	Environmental Bioaccumulation Value**	Ecosystem Toxicity/ Persistence Factor Value**	Ecosystem Toxicity/ Persistence Bioaccum. Factor Value	Ref.
Phenol	1,5	10,000	1.0	5.0	10,000	5×10^{4}	2, p. B-16
Phenanthrene	1,2,3,4,5	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-16
Pyrene	1,2,3,4,5	10,000	1.0	50	10,000	5×10^{5}	2, p. B-17
Silver	1,2,5	10,000	1.0	50	10,000	5×10^{5}	2, p. B-17
Selenium	1	1,000	1.0	5,000	1,000	5×10^{6}	2, p. B-17
Toluene	3,5	100	0.4	50	40	2,000	2, p. B-19
Trichloroethylene	3	100	0.4	50	40	2,000	2, p. B-19
Xylene	3,5	100	0.4	50	40	2,000	2, p. B-20
Zinc	1,2,3,4,5	10	1.0	500	10	5,000	2, p. B-20

Notes:

[a] No value listed for this hazardous substance in the SCDM

[b] Hazardous substance not listed in SCDM; therefore, no factor value can be calculated

*The persistence value listed for rivers was used.

**The environmental bioaccumulation and ecotoxicity values listed for freshwater were used.

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = $5x10^8$

4.1.4.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
2	Horseshoe Landfill	20.1	No
3	Island Landfill	7.56	No
4	Redhouse Run Landfill	5.77	No
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**180.83**	

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculation are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = $1\text{x}10^6$

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1\text{x}10^6 \times 50{,}000 = 5\text{x}10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present here that run contiguous to Herring Run. Hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) were detected in this sample that were also detected in samples collected from the five sources identified at the 68th Street Dump site.

Sample ID:	BR-SD03
Distance from PPE_{1A}:	8,204 feet
Reference:	Figures 2 and 3 in Appendix A

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

Wetlands

The PPE of hazardous substances into surface waters from sources 1, 2, 3, 4, and 5 is into wetlands. The hazardous substances detected at all of these sources and from the wetlands that remain at Sources 1, 2, and 5 are summarized under the observed release by direct observation, Section 4.1.2.1.

Total Length of Wetlands - Source 1

The PPE of hazardous substances from Source 1 into surface waters is into the wetlands documented to have covered the majority of Source 1 prior to landfilling. The total length of wetlands documented at Source 1 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of historical wetlands documented at Source 1 (Ref. 81, Figure 3). This length, as calculated by the ArcView GIS 3.2 computer program, is 2.02 miles. The assigned HRS wetland rating for Source 1 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

Total Length of Wetlands - Source 2

The PPE of hazardous substances from Source 2 into surface waters is into the wetlands documented to have covered the entire area of Source 2 prior to landfilling. The total length of wetlands documented at Source 2 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 2. This length is 0.96 mile; therefore, the assigned HRS wetland rating for Source 2 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

Total Length of Wetlands - Source 3

The PPE of hazardous substances from Source 3 into surface waters is into the wetlands documented to have covered the entire area of Source 3 prior to landfilling. The total length of wetlands documented at Source 3 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 3. This length is 0.45 mile; therefore, the assigned HRS wetland rating for Source 3 is 25 (Ref. 1, Table 4-24, p. 51625; Ref. 23; Ref. 81, Figure 3).

Total Length of Wetlands - Source 4

The PPE of hazardous substances from Source 4 is into the wetlands documented to have covered the entire area of Source 4 prior to landfilling. The total length of wetlands documented at Source 4 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 4. This length is 0.40 mile; therefore the assigned HRS wetland rating for Source 4 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

Total Length of Wetlands - Source 5

The PPE of hazardous substances from Source 5 into surface waters is into the wetlands documented to have covered the majority of Source 5 prior to landfilling. The total length of wetlands documented at Source 5 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of historical wetlands documented at Source 5 (Ref. 81, Figure 3). This length, as calculated by the ArcView GIS 3.2 computer program, is 1.37 miles. The assigned HRS wetland rating for Source 5 is 50 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

Total Length of Wetlands - 68th Street Dump Site

The total length of wetlands documented at the 68th Street Dump site, that are subject to Level II concentrations of hazardous substances, is determined by measuring the total perimeter of Sources 1, 2, 3, 4, 5. This length is 5.20 miles; therefore, the assigned HRS wetland rating for Level II concentrations for the 68th Street Dump site is 150 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 Potential Contamination

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 74). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

Chesapeake Bay:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands not counted as Level II targets occur along the Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\,D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$SP_{\textit{Back River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$SP_{\textit{Chesapeake Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$SP_{\textit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065

APPENDIX B

TABLE 1
WASTESTREAM ANALYSIS

Table 1
Wastestream Analysis
68th Street Dump
December 4, 2002

COMPANY	WASTES GENERATED	HAZARDOUS SUBSTANCES	SOURCE*	REFERENCE
Allied Chemical (Block and Wills Street and 2000 Race Street)	salt wastes, filter cake, cyanide acid, copper-laden spent solution, industrial trash, collection sump sludge	trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium	1, 2, 5	Ref. 10, pp. 14, 48, 49, 50, 57, 76, 79, 80, 81, 90, 91, 92, 109, 131, 132, 134, 135, 138, 138a, 161, 164, 165, 166, 168, 169, 170, 173, 174, 175, 177, 178, 179, 181 Ref. 84, pp. 81 through 90
Western Electric (Lucent Technologies)	Waste oil, paint thinner, sludge copper mud water, varnolene (hazardous due to ignitability), plating waste, phenolic slurry, copper fluoborate, trichloroethene	fluoboric acid, cyanide acid, trichloroethene	1, 2, 5	Ref. 10, pp. 15, 39, 113, 116, 118a, 118b, 134, 135, 138, 138a, 142, 143, 162, 169, 170, 172, 173, 174, 175 Ref. 84, pp. 38 and 71 through 79
The O'Brien Corporation	paint waste	paint waste	1, 5	Ref. 10, pp. 27, 140, 142, 143 Ref. 83, pp. 17, 18 Ref. 84, pp. 1 through 4
General Motors	55-gallon drums of industrial wastewater treatment sludge, incinerator ash, paint sludge, solvents, waste oils, styrofoam	antimony, barium, cadmium, chromium, copper, iron, lead, manganese, nickel, zinc	1, 2, 3, 4, 5	Ref. 10, pp. 4, 15, 16, 17, 25, 38, 49, 50, 80, 84, 113, 115, 118a, 118b, 140, 141, 143, 162, 164, 165, 166, 169, 170, 172, 173, 174, 175 Ref. 83, pp. 10, 16, 17, 20, 21, 23, 29, 85, 86 Ref. 84, pp. 10 through 18
Noxell Corporation	outdated products such as face and shaving creams, manufacturing wastes	flammable liquid, corrosive liquid, sodium hydroxide, 1,1,1-trichloroethane, acetone, hazardous waste liquid, waste enamel	1, 2, 5	Ref. 10, pp. 15, 16, 71, 116, 118a, 157, 160, 163, 164, 165, 166 Ref. 84, pp. 19 through 25

Table 1 (Continued)
Waste Stream Analysis
68th Street Dump
December 4, 2002

COMPANY	WASTES GENERATED	HAZARDOUS SUBSTANCES	SOURCE*	REFERENCE
GAF Materials	Old tar paper, roofing shingles	polyaromatic hydrocarbons	1,2,4,5	Ref. 10, pp. 14 and 159, 163, 164, 165, 166 Ref. 60, p. 9 Ref. 82, pp. 13 and 14 Ref. 84, pp. 26 through 29
Baltimore Gas and Electric	Bottom ash, fly ash, waste oil, slag	arsenic, cadmium, hexavalent chromium, lead, mercury, selenium, silver, copper, ammonia nitrate	1, 2, 4, 5	Ref. 10, pp. 7, 14, 17, 25, 27, 32, 33, 42, 44, 49, 58, 94, 96, 113, 114, 118a, 118b, 126, 130, 132, 145, 146, 149, 156, 161, 162, 164, 165, 166 Ref. 84, pp. 30 through 39
Crown, Cork, & Seal	lubricating fluid, waste oil, cork dust, lacquered-paper	phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid	1, 2, 5	Ref. 10, pp. 14, 26, 38, 80, 83, 103, 104, 105, 126, 140,141, 143, 145, 146, 149, 156, 163, 164, 165, 166, 169, 170, 172, 173, 174, 175 Ref. 84, pp. 40 through 51
Lasting Product Company	10 55-gallon drums of paint type products	paint waste	1	Ref. 10, pp. 5, 140, 141, 142, 143
Exxon (Standard Oil)	waste oil, tank cleaning wastes, leaded tank bottoms, solid asphalt wastes	lead, zinc, barium, cadmium, chromium	tank cleaning waste disposed of into pit on Source 5	Ref. 10, p. 27 Ref. 83, pp. 14 and 47 Ref. 84, pp. 52 through 58
Armco	slag, flue dust, refractory dust, copper molds, waste oil, hydraulic oil, waste grease, wastewater, sludge, lead dross, spent coating solutions, plating tank sludge, cleansing tank sludge, spent cleaning solvents, spent molyddenum coating spent coating solutions	iron oxides, nickel, manganese, chromium, iron, carbon, silicone, tin, zinc, copper, lead	1, 2, 5	Ref. 10, pp. 66, 113, 114, 118a, 118b, 145, 146, 149 Ref. 84, pp. 59 through 70

Table 1 (Continued)
Waste Stream Analysis
68th Street Dump
December 4, 2002

COMPANY	WASTES GENERATED	HAZARDOUS SUBSTANCES	SOURCE*	REFERENCE
Signode Steel	waste paint	lead	2, 5	Ref. 10, pp. 80, 88, 113, 116, 118a, 118b Ref. 83, pp. 17 and 19 Ref. 84, pp. 91 through 93
Bruning Paint Company (Chevron Corp.)	empty raw material drums, still bottoms, empty pigment bags, damaged paint cans	paint residue	1, 2, 5	Ref. 10, pp. 16, 25, 38, 113, 114, 118a, 118b, 141, 143, 162, 164, 165, 166 Ref. 83, p. 19 Ref. 84, pp. 94 through 96
SCM (Glidden Durkee, Co.)	sludge, and wastes generated by the manufacture of frit and inorganic oxides	lead, cadmium, chromium, hexavalent chromium, copper, nickel, zinc, barium, carbonate, cryolite-asbestos, lead oxide, potassium nitrate, and sodium nitrate	1, 2, 5	Ref. 10, pp.80, 84, 113, 115, 118a, 118b, 145, 147, 149, 169, 170, 172, 173, 174, 175 Ref. 84, pp. 97 through 101
Koppers	oils, solvents, coolant, sludges, acrylate and latex emulsions, resins, esters, waste paints and pigments	manganese, zinc, cadmium, copper, chromium, trichloroethyelene, PCBs	1, 2, 4, 5	Ref. 10, pp. 85, 115, 118a, 119, 120, 122a, 169, 170, 172, 173, 174, 175 Ref. 84, pp. 102 through 111
The Baltimore Sun	printing process waste, photographic developing chemicals	solvents, lead, ink	1, 2, 5	Ref. 10, pp. 80, 89, 169, 170, 171, 173, 174, 175, 177, 178, 179, 181 Ref. 84, pp. 112, 113
The Maryland Cup	ink, liquid latex waste, liquid glue waste, liquid solid waste, varnalene	1,1,1-trichloroethane, ink	Cannot be determined with existing information	Ref. 10, pp. 90, 91, 110 Ref. 84, pp. 114 through 117

* As discussed in the 68th Street Documentation Record, available information indicates that wastes were dumped concurrently at all five sources; however in some cases the referenced documents can be used to determine waste disposal at specific sources. In these cases, a source number has been assigned in the source column of Table 1.

APPENDIX C

SOURCE 1 SCORING

SOURCE 1 SCORESHEETS
COLGATE PAY DUMP/ORIGINAL LANDFILL

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP
SOURCE 1

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		50.00

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP
SOURCE 1

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)]	500	---
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP
SOURCE 1

	Factor Categories and Factors Assigned	Maximum Value	Value Assigned
	Human Food Chain Threat		
	Likelihood of Release		
14.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics	1,000	1,000
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	–
	19d. Population [lines 19a + 19b + 19c]	b	0.03
20.	Targets [lines 18 + 19d]	b	45.03
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68TH STREET DUMP
SOURCE 1

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	75
	26c. Potential Contamination	b	0.0065
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	75.01
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	60
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT - SOURCE 1

Prior to landfilling, this source was predominately covered with PSS/FO and PEM wetlands located adjacent to Herring Run and Moore's Run. The only area not historically designated as wetlands was located in the northern portion of the source (Ref. 81, Figure 3). The historical aerial photography study completed for the site documents that the wetlands located adjacent to Moore's Run and Herring Run were landfilled with wastes; therefore, the PPE into surface waters of the hazardous substances documented in these wastes is in these wetlands (Ref. 81, Figures 3 and 7). The wetlands located in the north-eastern portion of Source 1 would eventually have discharged into Moore's Run, the wetlands located in the southern portion of Source 1 would eventually discharge into Herring Run. The in-water segment of the surface water pathway TDL was determined from the farthest upstream and downstream points where the wetlands and non-wetland areas of Source 1 would discharge into Herring Run (PPE_{1A} and PPE_{1B}) and Moore's Run (PPE_{1C} and PPE_{1D}). From PPE_{1A}, Herring Run flows in a southeasterly direction for approximately 1.5 miles until it discharges into the Back River. From the farthest upstream PPE in Moore's Run (PPE_{1C}), the in-water segment continues in Moore's Run in a southeasterly direction for approximately 0.53 mile until it discharges into Herring Run. From this point, Herring Run flows in a southeasterly direction for approximately 0.71 mile until it becomes the Back River. The Back River flows in an easterly direction for about 8.5 miles until it discharges into the Chesapeake Bay. The 15-mile surface water pathway target distance limit (TDL) ends in the Chesapeake Bay (as measured along the in-water segment from PPE_{1A} to 15 miles downstream of PPE_{1D}) (see Figures 4 and 6 in Appendix A).

Available data indicates that all of the surface water bodies located along the 15-mile TDL are tidally influenced (Ref. 16; Ref. 17; Ref. 18; Ref. 62; Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). Data does not exist to document the potential tidal carry of hazardous substances in the area of the site; however, during the April 6 through May 3, 2000 ESI, the sampling team observed and documented the tidal effect on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed to extend to the second overpass of the Interstate 95 highway (Ref. 81, Ref. 82, Logbook 2, p. 7).

4.1.2.1 LIKELIHOOD OF RELEASE - SOURCE 1

4.1.2.1.1 Observed Release - Source 1

Direct Observation- Source 1

- Basis for Direct Observation - Source 1

Source 1 was occupied by landfills operated by Robb Tyler and Henry Siejack during the 1950s and the 1960s. In September 1956, Henry Siejack was issued a permit to operate a landfill on 24 acres in Baltimore County. No permit was received to dispose of wastes on the portion of Siejack's property located along the City of Baltimore-Baltimore County line; however, aerial photographs and MD DHMH inspection reports document that wastes were deposited into the wetlands that once occupied this portion of the property as well (Ref. 6, pp. 6 through 15; Ref. 25; Ref. 55; Ref. 81). On September 16, 1953, Robb Tyler was issued a permit by the Baltimore County Health Department to operate a sanitary landfill on the property that he owned in the center of Source 1 (Ref. 8, pp. 1, 18 and 26).

Historical aerial photographs document that prior to use as a dump, PSS/FO and PEM wetlands covered a large portion of Source 1, between Moore's Run and Herring Run (Ref. 6, pp. 7 and 9; Ref. 81, Figure 3). The dumping of materials at Source 1 diverted the flow of Herring Run south of its original path (Ref. 6, pp. 10 and 11; Ref. 81). This indicates that materials deposited at Source 1 were in direct contact with adjacent surface waters. The documentation that wastes were deposited directly into surface waters is further documented in MD DHMH inspection reports prepared in 1955. Specifically, an inspection report dated January 7, 1955 documents that wastes were being deposited along a tributary of Herring Run, causing this tributary to dam up. The report further notes that "heavy pollution" in the form of an oil slick was observed entering this tributary (Ref. 8, p. 29). The inspectors also noted an "exceedingly large amount of barrels" strewn haphazardly on the landfill surface and a pit (measuring approximately 30 by 50 feet), that was being used for disposal of waste oil (Ref. 8, p. 29). An April 1955 inspection report documents that oil seepage from the pit was observed on the ground (Ref. 8, p. 32). Oil placed in this pit and another pit was deposited directly above "natural earth" (Ref. 8, p. 33).

Interviews conducted of former employees and waste haulers associated with the 68th Street Dump further document that the hazardous wastes disposed of at Source 1 were deposited directly into surface waters and wetlands. A former foreman at the 68th Street Dump site identified the area of Source 1 as the disposal area used by Robb Tyler in the 1950s and 1960s. He further stated that "waste materials disposed of at the 68th Street Dump site were dumped in swamp areas, and then covered up" (Ref. 10, pp. 161 and 166). A trash truck driver stated that Henry Siejack also dumped into the wetlands of Source 1.indicated that "waste materials disposed of at the 68th Street Dump site were dumped in swamp areas, and then were covered up" (Ref. 10, p. 161). This former trash truck driver further stated that Siejack would dig holes in the ground near the water. The water level and tide would then come in and cover up the holes full of waste. According to his interview, Siejack would do this to avoid detection of his waste disposal activities (Ref. 10, pp. 167 and 169).

The filling of wetlands with wastes is also documented by the historical aerial photographs taken of the site. A review of these aerial photographs document the filling of a total of 23.1 acres of PSS/FO and PEM wetlands at Source 1 (Ref. 81, pp. 15 and Figures 3 through 7).

In addition, indications that hazardous substances in materials deposited at Source 1 were in direct contact with surface waters is supported by the fact that Source 1 is located within the 100-year flood plain (Ref. 86). Baltimore County is nationally identified as an area that suffers severe losses due to floods (Ref. 88, p. 3). Major floods have occurred in Baltimore County in October 1954, August 1955, August 1971, June 1972 and September 1975 (Ref. 64, p. 7; Ref. 87, p. 4). One of the most damaging floods recorded in the Baltimore area occurred on August 1 through 2, 1971. The flood waters recorded in the Back River basin were equivalent to, or in excess of, the 100-year flood interval (Ref. 87, p. 7). A second major flood occurred in Baltimore during Hurricane Agnes, from June 21 through 23, 1972. Flood peaks greater than 100-year intervals were recorded in Baltimore at this time (Ref. 87, p. 7). Because the entire area of Source 1 is located within the 100-year flood zone, the waste that contained hazardous substances, which documentation indicates was disposed of at Source 1 during the 1950s and 1960s, was in direct contact with these flood waters. The National Climatic Data Center (NCDC) has documented several, more recent storm events (June 1996, September 1999, and July 14, 2000) that have caused flash flooding in the area where the 68th Street Dump site is located (Ref. 63). In 1996, Hurricane Fran produced stream flows in Maryland among the highest ever seen and in 1999 heavy downpours (4.77 inches fell in the space of a few hours) led to major flooding in the Baltimore area (Ref. 89, p.1; Ref. 90, p. 1). Analytical results from the samples collected from Source 1 in 1985, 1993 and in April 2000 document that hazardous substances were present at Source 1 during these flash flood events. Additional evidence that the area of the 68th Street Dump is prone to flash floods is provided by observations of the banks of Herring Run and Moore's Run. The banks of these streams adjacent to the 68th Street Dump site show evidence of the increase in flow due to storm events (Ref. 15, p. 5; Ref. 18; Ref. 68; Ref. 69; Ref. 76). Exposed landfilled materials have been observed in Herring Run due to erosion of its bank (Ref. 69).

- Hazardous Substances in the Release - Source 1

Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of waste was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156, and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that covered all five source areas, including Source 1, during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these waste streams have been summarized in Table 1 in Appendix B.

EPA interviews conducted of former Robb Tyler employees and waste haulers provides evidence that waste streams generated by the following industries were disposed of at Source 1: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; GAF Materials; Armco; Koppers; the O'Brien Company; General Motors; Crown, Cork, & Seal; Lasting Product Company; Bruning Paint Company; SCM (Glidden Durkee, Co.); and the Baltimore Sun. Hazardous substances associated with the waste streams generated by these industries include trivalent chromium, potassium bichromate; copper; kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

Although the majority of the wetlands documented to have at one time existed at Source 1 have subsequently been filled in, a few wetland areas remain. The location of these remaining wetlands were field verified by representatives of the U.S. Fish and Wildlife Service during the 2000 ESI sampling event (Ref. 82, Log book 2, pp. 2, 10, 16 through 19). The laboratory analytical results of samples collected from these wetlands document the presence of hazardous substances in Source 1 wetlands. The table below summarizes the samples collected during the 2000 ESI from these wetlands. These samples were analyzed under EPA's CLP (Ref. 7, p. 1). To identify metal concentrations exceeding background levels, the metal concentrations detected in these wetland samples were compared to the analytical results from a sediment sample collected from a wetland located outside the influence of the site. This sample was collected in a wetland area located along Herring Run, upstream of the 68th Street Dump site. The sample was collected by the EPA Region 3 START in February 2001 and was analyzed for the same parameters as the samples collected from Source 1 (TCL organics and TAL metals by an EPA CLP laboratory) (Ref. 65). All sampling locations are shown on Figure 2 in Appendix A.

Hazardous Substance	Evidence	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics				
Fluoranthene	MRWT-SD01	830	598.9	7, p. 221; 79
	ORWT-SD04	630	460.1	7, p. 221; 79
	HRWT-SD03	1,700	956	7, p. 223; 79
Pyrene	MRWT-SD01	890	598.9	7, p. 221; 79
	ORWT-SD04	560	598.8	7, p. 221; 79
	HRWT-SD03	1,500	956	7, p. 223; 79

Hazardous Substance	Evidence	Concentration* (µg/kg)	SQL (µg/kg)	Reference
alpha-Chlordane	MRWT-SD01	36	3.15	7, p. 224; 79
	ORWT-SD03	12	2.58	7, p. 224; 79
	HRWT-SD02	34 J (3.4)	3.43	7, P. 225; 79
gamma-Chlordane	MRWT-SD01	33	3.15	7, p. 224; 79
	HRWT-SD02	38 J (3.8)	3.15	7, p. 224; 79
Aroclor-1260	ORWT-SD03	240	50	7, p. 224; 79
	ORWT-SD04	130 J (13)	46	7, p. 224; 79
	HRWT-SD01	130 J (13)	79.7	7, p. 224; 79

Hazardous Substance	Evidence	Concentration* (mg/kg)	Background Concentration (SED-01) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Arsenic	ORWT-SD03	4.6 J (2.6)	ND	3.07	7, p. 83; 65, p. 5; 79
	ORWT-SD04	3.7 J (2.1)	ND	2.8	7, p. 83; 65, p. 5; 79
Chromium	ORWT-SD03	154	21.6	3.1	7, p. 83; 65, p. 5; 79
	ORWT-SD04	75.1	21.6	2.8	7, p. 83; 65, p. 5; 79
	ORWT-SD05	72.1	21.6	2.8	7, p. 83; 65, p. 5; 79
	HRWT-SD01	83.3	21.6	5.11	7, p. 83; 65, p. 5; 79
Copper	ORWT-SD03	111	28.5	7.7	7, p. 83; 65, p. 5; 79
	HRWT-SD01	102	28.5	12.8	7, p. 83; 65, p. 5; 79
Lead	MRWT-SD01	218	49.8	1.29	7, p. 83; 65, p. 5; 79
	ORWT-SD03	365	49.8	0.92	7, p. 83; 65, p. 5; 79
	ORWT-SD04	170	49.8	0.84	7, p. 83; 65, p. 5; 79
	ORWT-SD05	214	49.8	0.84	7, p. 83; 65, p. 5; 79
	HRWT-SD01	287	49.8	1.53	7, p. 83; 65, p. 5; 79
Mercury	ORWT-SD03	0.36	[0.12] K	0.3	7, p. 83; 65, p. 5; 79
	HRWT-SD01	0.29 B	[0.12] K	0.3	7, p. 83; 65, p. 5; 79
Nickel	ORWT-SD03	56.9	15.8	12.3	7, p. 83; 65, p. 5; 79
	HRWT-SD01	49.1	15.8	20.5	7, p. 83; 65, p. 5; 79
Zinc	MRWT-SD01	323	75.1	8.62	7, p. 83; 65, p. 5; 79
	ORWT-SD03	464	75.1	6.13	7, p. 83; 65, p. 5; 79
	HRWT-SD01	420	75.1	10.2	7, p. 83; 65, p. 5; 79
	HRWT-SD02	267	75.1	8.3	7, p. 83; 65, p. 5; 79

Notes:

*	All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
ND	Not detected above the SQL
SQL	Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
K	Analyte present; reported value may be biased high

Further evidence that hazardous substances were deposited directly into the wetlands of Source 1 is provided by laboratory analytical results of samples collected during three sampling events. Samples were collected in 1985 by MD WMA, in 1993 by MDE, and in 2000 by the EPA Region 3 SATA team.

Analytical results for the samples are provided as evidence of hazardous substance deposition into wetlands because the samples were collected at Source 1 in locations documented by historical aerial photographs to have at one time been covered in wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 6, pp. 6 through 15; Ref. 81, pp. 15 and Figures 3 through 7). No waste has been removed from Source 1; therefore, the analytical results summarized in the tables below document the hazardous substances present in the waste that was directly deposited into wetlands and also were present during the flood events discussed in this section under, "Basis for Direct Observation".

MD WMA Sample Results - 1985

Samples of the contents of the drums observed at Source 1 in 1985 by MD WMA were collected and analyzed for EP toxicity metals (Ref. 8, pp. 3, 59, 95 through 105). Analytical results indicated the presence of hexavalent chromium and lead concentrations above EP toxic levels (Ref. 8, pp. 3, 59, 95, 97, 98, 103, 104, and 105). These results document that waste characterized as hazardous based on the toxicity characteristic were disposed of at Source 1. As shown in the tables below, lead and chromium have also been detected at elevated levels in samples collected from the wetlands that remain at Source 1.

MDE Sample Results - 1993

In 1993, the MDE collected samples from Source 1. These samples were collected in an area designated as wetlands at the time the samples were collected (Ref. 9, p. 47). The area where these samples were collected was in an area historically covered in PSS/FO and PEM wetlands (Ref. 81, pp. 5, 15 and Figure 3). These samples were analyzed in accordance with CLP protocols (Ref. 9, pp. 18, 20, and 47). Two samples, Soil-5 and Soil-6, were collected to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of the metals detected at Source 1. If the metal was detected in both background samples the sample with the higher concentration was used as the comparative sample. The table below presents the sample with the highest concentration of each hazardous substance detected at Source 1 (for a complete list of all contaminated samples see Section 2.2).

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Benzo(a)anthracene	Soil-2	910	375	9, pp. 156 and 299; 79
Benzo(b)fluoranthene	Soil-2	1900	375	9, pp. 156 and 299; 79
Chlordane (alpha)	Soil-4	4.2	1.9	9, pp. 156 and 357; 79
Chlordane (gamma)	Soil-3	8.7	2.1	9, pp. 156 and 356; 79
4,4'-DDE	Soil-3	32	4.0	9, pp. 156 and 356; 79
Fluoranthene	Soil-2	2,000	375	9, pp. 156 and 299; 79
Phenanthrene	Soil-2	1,200	375	9, pp. 156 and 299; 79
Pyrene	Soil-2	740	375	9, pp. 156 and 299; 79

Hazardous Substance	Evidence	Concentration* (mg/kg)	Background Concentration (Soil-5 or Soil-6)* (mg/kg)	SQL (mg/kg)	Reference
Metals					
Aluminum	Soil-13	118,000	6,470	48.3	9, pp. 113, 231 and 232; 79
Arsenic	Soil-2	56.2 L	3.9 L (6.79)	2.3	9, pp. 113, 228, 231 and 232; 79
Barium	Soil-13	2,250	74.1	48.3	9, pp. 113, 229, 231 and 232; 79
Cadmium	Soil-3	101	ND	1.3	9, pp. 113, 229, 231 and 232; 79
Chromium	Soil-13	299 J (231.8)	29.3 J (37.8)	2.4	9, pp. 113, 229, 231 and 232; 79
Copper	Soil-2	5,270	25.8	5.7	9, pp. 113, 229, 231 and 232; 79
Lead	Soil-3	2,680	201 J (289)	0.8	9, pp. 113, 229, 231 and 232; 79
Manganese	Soil-3	2,060 J (1661)	240 J (297.6)	3.8	9, pp. 113, 229, 231 and 232; 79
Mercury	Soil-1	1.8	0.28	0.1	9, pp. 113, 229, 231 and 232; 79
Nickel	Soil-2	121	ND	9.1	9, pp. 113, 229, 231 and 232; 79
Selenium	Soil-3	10.4 L	ND	6.3	9, pp. 113, 229, 231 and 232; 79
Silver	Soil-3	12.6	ND	2.5	9, pp. 113, 229, 231 and 232; 79
Zinc	Soil-3	4,560	77.0	5.0	9, pp.113, 229, 231 and 232; 79

Notes:

*	All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram
ND	Not detected above the SQL
SQL	Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
L	Analyte present; reported value may be biased low
[ ]	Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

EPA SATA Team Results - 2000

Further evidence that hazardous substances were deposited directly into the wetlands of Source 1 is provided by laboratory analytical results of samples collected in 2000 by the EPA Region 3 SATA team. Sampling locations are shown in Figure 2 in Appendix A. Analytical results for the samples are provided as evidence of hazardous substance deposition into wetlands because the samples were collected at Source 1 in locations documented by historical aerial photographs to have at one time been covered in wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 6, pp. 6 through 15; Ref. 81). No waste has been removed from Source 1; therefore, the analytical results summarized in the table below document the hazardous substances present in the waste that was directly deposited into the wetlands of Source 1. To identify metal concentrations exceeding background levels, the metal concentrations detected at Source 1 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12). Only the analytical result for the sample with the highest concentration of each hazardous substance is provided in the table below, (for a complete list of all contaminated samples collected from Source 1, see Section 2.2, Source Characterization).

Hazardous Substance	Evidence	Concentration * (µg/kg)	SQL (µg/kg)	Reference
Organics				
2-Methylnaphthalene	ORLF-WS19B	190,000	11,579	7, p. 110; 79
	ORLF-WS26B	9,300	825	7, p. 114; 79
4-Chloroaniline	ORLF-WS26B	18,000	825	7, p. 114; 79
4-Niroaniline	ORLF-WS26B	32,000	2075	7, p. 115; 79
Acenaphthene	ORLF-WS20B	11,000	4,177	7, p. 112; 79
	ORLF-WS26B	20,000	825	7, p. 114; 79
Anthracene	ORLF-WS20B	9,300	4,177	7, p. 113; 79
	ORLF-WS26C	52,000	15,865	7, p. 115; 79
Benzo(a)anthracene	ORLF-WS26C	140,000 +	63,461	7, p. 115; 79
Benzo(b)fluoranthene	ORLF-WS01B	1,100	412.5	7, p. 107; 79
	ORLF-WS26C	150,000 +	63,461	7, p. 115; 79
Benzo(k)fluoranthene	ORLF-WS05B	1,100	795.2	7, p. 107; 79
	ORLF-WS26A	3,200	2,012	7, p. 115; 79
Benzo(g,h,i)perylene	ORLF-WS26C	33,000	15,865	7, p. 115; 79
Benzo(a)pyrene	ORLF-WS05B	1,100	795.2	7, p. 107; 79
	ORLF-WS26C	120,000	15,865	7, p. 115; 79
bis(2-Ethylhexyl)phthalate	CPLF-WS05B	49,000	10,061	7, p. 129; 79
	ORLF-WS19B	82,000	11,579	7, p. 111; 79
Butylbenzylphthalate	CPLF-WS08B	13,000	825	7, p. 131; 79
	ORLF-WS20B	7,900	4,177.2	7, p. 113; 79
Carbazole	ORLF-WS20B	4,700	4,177.2	7, p. 113; 79
	ORLF-WS26B	19,000	825	7, P. 115; 79

Hazardous Substance	Evidence	Concentration * (µg/kg)	SQL (µg/kg)	Reference
Chrysene	ORLF-WS01B	1,100	412.5	7, p. 107; 79
	ORLF-WS26C	120,000	15,865	7, p. 115; 79
4,4-DDD	ORLF-WS18B	150 +	41.25	7, p. 118; 79
4,4-DDT	ORLF-WS18B	360 J (28.1)	4.125	7, p. 118; 79
Dibenzofuran	ORLF-WS20B	9,000	4,177.2	7, p. 113; 79
	ORLF-WS26B	22,000	825	7, p. 115; 79
Dibenz(a,h)anthracene	ORLF-WS26C	20,000	15,865	7, p. 115; 79
Di-n-butylphthalate	CPLF-WS08B	3,400	825	7, p. 131; 79
Fluoranthene	ORLF-WS20B	17,000	4,177.2	7, p. 113; 79
	ORLF-WS26C	340,000	15,865	7, p. 115; 79
Fluorene	ORLF-WS20B	14,000	4,177.2	7, p. 113; 79
gamma-Chlordane	ORLF-WS20A	42 +	10.6	7, p. 118; 79
	ORLF-WS28B	170 + J (17)	36.2	7, p. 120; 79
Hexachlorocyclopentadiene	CPLF-WS08B	1,600 J (160)	825	7, p. 130; 79
Indeno(1,2,3-cd)pyrene	ORLF-WS20B	560 J (56)	4,177.2	7, p. 113; 79
	ORLF-WS26C	39,000	15,865	7, p. 115; 79
Naphthalene	CPLF-WS08B	2,700	825	7, p. 130; 79
	ORLF-WS18B	74,000	4,125	7, p. 110; 79
Phenanthrene	ORLF-WS20B	42,000 +	8,354	7, p. 113; 79
	ORLF-WS26C	160,000 +	63,461	7, p. 115; 79
Pyrene	ORLF-WS20B	13,000	4,177	7, p. 113; 79
	ORLF-WS26C	250,000 +	63,461	7, p. 115; 79
Aroclor-1232	ORLF-WS01B	3,300 + J (330)	412.5	7, p. 116; 79
	CPLF-WS05B	15,000 +J (1,500)	805	7, p. 132; 79
Aroclor-1242	CPLF-WS08D	3,300 +J (330)	209	7, p. 133; 79
Aroclor-1254	ORLF-WS01B	2,700 +	412.5	7, p. 116; 79
	CPLF-WS06B	500	80.5	7, p. 133; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration* (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	ORLF-WS08B	326 L	ND	16.3	7, pp. 12, 38, 87; 79
	ORLF-WS25B	419 L	ND	16.0	7, pp. 12, 41, 87; 79
Arsenic	ORLF-WS09B	35.9 L	4.3 L (7.48)	2.6	7, pp. 12, 38, 87; 79
Barium	ORLF-WS07B	1,500	118	60.8	7, pp. 12, 37, 87; 79
Cadmium	ORLF-WS09B	8.4	ND	1.3	7, pp. 12, 38, 87; 79
	ORLF-WS20A	5.7	ND	1.3	7, pp. 12, 40, 87; 79
Chromium	CPLF-WS08D	483 L	27	2.5	7, pp. 12, 46, 87; 79
	ORLF-WS20A	359	27	2.5	7, pp. 12, 40, 87; 79
Copper	CPLF-WS04B	249	33.7	5.8	7, pp. 12, 45, 87; 79
	ORLF-WS20A	349	33.7	6.3	7, pp. 12, 40, 87; 79
Lead	ORLF-WS19B	2,760	101	1.1	7, pp. 12, 39, 87; 79
	ORLF-WS27B	3,730	101	0.8	7, pp. 12, 41, 87; 79
Manganese	ORLF-WS09B	4,350 L	487	3.9	7, pp. 12, 38, 87; 79
	ORLF-WS18B	6,050	487	4.0	7, pp. 12, 39, 87; 79
Mercury	ORLF-WS20A	2.6	0.18	0.1	7, pp. 12, 40, 87; 79
	ORLF-WS25B	1.6	0.18	0.1	7, pp. 12, 41, 87; 79
Nickel	CPLF-WS08C	615	16.3	10.5	7, pp. 12, 46, 87; 79
	ORLF-WS20B	211	16.3	10.1	7, pp. 12, 40, 87; 79
Silver	ORLF-WS10C	22.0	ND	2.8	7, pp. 12, 38, 87; 79
	ORLF-WS28B	8.6	ND	4.9	7, pp. 12, 41, 87; 79
Zinc	ORLF-WS04B	2,690 L	142	5.5	7, pp. 12, 37, 87; 79
	ORLF-WS07B	2,050 L	142	6.1	7, pp. 12, 37, 87; 79

Notes:

*	All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
ND	Not detected above SQL
SQL	Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
L	Analyte present; reported value may be biased low
+	Results reported from diluted sample

Chemical Analysis - Source 1

- MDE ESI Sample Results - 1993

An observed release of hazardous substances from Source 1 into Herring Run can be documented based on chemical analysis of samples collected in 1993 during the MDE ESI (Ref. 9, pp. 18, 20, and 47). All samples collected during the ESI were analyzed for TCL organic and TAL inorganic compounds in accordance with EPA CLP protocols (Ref. 9, p. 18). Samples collected directly downstream of Source 1 have been compared to samples collected upstream of all of the other sources identified at the 68th Street Dump site.

- Background Samples

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-8	Moore's Run	Unknown	6/3/93	9, pp. 19, 162, 170 and 171
SED-11	Herring Run	Unknown	6/2/93 - 6/3/93	9, pp. 20, 153, 170 and 171

- Background Concentrations

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
SED-8	Benzo(b)fluoranthene	ND	371	9,pp. 162, 323; 79
	Fluoranthene	ND	371	9, pp. 162, 323; 79
SED-11	Benzo(b)fluoranthene	ND	440	9, pp. 153, 291; 79
	Fluoranthene	ND	440	9, pp. 153, 291; 79
	Phenanthrene	ND	440	9, pp. 153, 291; 79

Notes:

µg/kg Micrograms per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit, SQL calculations provided in reference 79

- Release Samples

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-7	Moore's Run	Unknown	6/2/93 - 6/3/93	9, pp. 19, 153, 170, 171
SED-9	Herring Run	Unknown	6/2/93 - 6/3/93	9, pp. 19, 153, 170, 171

- Release Concentrations

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
SED-7	Benzo(b)fluoranthene	740	452	9,pp. 153, 283; 79
	Fluoranthene	750	452	9, pp. 153, 283; 79
SED-9	Benzo(b)fluoranthene	600	465	9, pp. 153, 285; 79
	Fluoranthene	880	465	9, pp. 153, 285; 79
	Phenanthrene	500	465	9, pp. 153, 285; 79

Notes:
µg/kg Micrograms per kilogram
SQL Sample quantitation limit, calculations provided in reference 79

An observed release from Source 1 into Herring Run and Moore's Run can also be documented based on chemical analysis of samples collected during the ESI completed by the EPA Region 3 SATA team in 2000. For Herring Run, analytical results for downstream sampling locations were compared to the analytical results for a sample collected upstream of Source 1 (HR-SD03). Another upstream sample, HR-SD02, was collected during the ESI above where five or six stormwater outfalls discharge into Herring Run. The sample, HR-SD03 was collected downstream of where these outfalls discharged (Ref. 82, Logbook 2, p. 7). The sample HR-SD02, was determined to not be a suitable background sample because of difficulties encountered by the laboratory during the analysis of this sample. The sample had to be diluted prior to analysis, resulting in a very high sample quantitation limit (SQL) (Ref. 91). The estimated concentrations and number of hazardous substances reported in HR-SD02 was less than the concentrations and number of hazardous substances reported in HR-SD03; therefore, using HR-SD03 as the background sample presents the most conservative approach to scoring the surface water pathway (Ref. 7, p. 178).

The ESI sampling team conducted sampling activities at the site from April 6 through May 3, 2000, during this time period tidal effect was observed on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 18; Ref. 82, Logbook 2, p. 7). The background sample HR-SD03 was collected above the point of the observed upstream extent of tidal effect in Herring Run (Figure 2, which can be found in Appendix A).

For Moore's Run, analytical results from the chosen surface water and sediment background sampling location (MR-SD/SW02) were compared to the analytical results for samples collected from two locations downstream of Source 1 (MR-SD/SW05 and MR-SD/SW06). A second upstream sediment sample (MR-SD01) was collected in Moore's Run during the ESI. This sample does not meet the criteria as an appropriate background sample because it was collected in an area where an oil sheen was observed and would therefore not accurately reflect the ambient background concentrations of hazardous substances in Moore's Run (Ref. 82, Logbook 2, pp. 5 and 6).

The background sediment samples (HR-SD03 and MR-SD02) were collected during the same sampling event, using the same protocols, and within the same urban environment as the release samples. The background aqueous sample was collected from the same surface water body on the same day as the release aqueous sample. There were no documented occurrences of rainfall events between the collection of the background aqueous and release aqueous samples (Ref. 82, Logbook 2, pp. 10 and 11). Environmental parameters including pH, conductivity, dissolved oxygen, temperature, and salinity readings were measured at both the background and release aqueous sampling locations and indicate that the background and release samples were located in similar environmental settings (Ref. 82, Logbook 2, pp.10 and 11). All sampling locations are shown in Figure 2 in Appendix A.

- Background Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
HR-SD03	Herring Run	0-6	4/7/00	7, p. 19; 18; 82, Logbook 2, pp. 7 and 9
MR-SD02	Moore's Run	0-6	4/7/00	7, p. 21; 18; 82, Logbook 1, p. 5 and Logbook 2, pp. 6 and 9

-Background Samples - Aqueous

Sample ID	Sample Location	Date	Reference
MR-SW02	Moore's Run	4/10/00	7, p. 21; 82, Logbook 2, pp. 6 and 11

- Background Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
HR-SD03	Benzo(a)anthracene	ND	434.2	7, p. 178; 79
	Benzo(k)fluoranthene	ND	434.2	7, p. 178; 79
	Benzo(a)pyrene	ND	434.2	7, p. 178; 79
	Benzo(g,h,i)perylene	ND	434.2	7, p. 178; 79
MR-SD02	Aroclor-1260	ND	40.9	7, p. 201; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
HR-SD03	Lead	38.6 B	0.89	7, p. 66; 79
MR-SD02	Lead	10.6 B	0.77	7, p. 74; 79
	Zinc	35.6 B	5.1	7, p. 74; 79

Notes:

µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
ND	Not detected above the SQL
SQL	Sample quantitation limit; calculations provided in reference 79

Analytical Data Qualifiers:

B	Not detected substantially above the level reported in laboratory or field blanks
J	Analyte present; reported value may not be accurate or precise

- Background Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (µg/L)	CRDL (µg/L)	Reference
MR-SW02	Chromium	ND	10	7, p. 75
	Lead	ND	3	7, p. 75
	Barium	ND	200	7, p. 75
	Manganese	201	15	7, p. 75
	Zinc	27.7 B	20	7, p. 75

Notes:

B	Not detected substantially above the level reported in laboratory or field blanks
CRDL	Contract-required detection limit
µg/L	Micrograms per liter
ND	Not detected above the CRDL

- Release Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
HR-SD04	Herring Run	0-6	4/7/00	7, p. 19; 18; 82, Logbook 2, pp. 8 and 9
HRB-SD03	Herring Run	0-6	4/24/00	7, p. 20; 18; 82, Logbook 2, p. 22
HRB-SD04	Herring Run	0-6	4/24/00	7, p. 20; 18; 82, Logbook 2, p. 22
HRB-SD05	Herring Run	0-6	4/26/00	7, p. 20; 18; 82, Logbook 2, p. 28
MR-SD05	Moore's Run	0-6	4/10/00	7, p. 21; 18; 82, Logbook 2, p. 9
MR-SD06	Moore's Run	0-6	4/10/00	7, p. 21; 18; 82, Logbook 2, p. 10

- Release Samples - Aqueous

Sample ID	Sample Location	Date	Reference
MR-SW04	Moore's Run	4/10/00	7, p. 21; 82, Logbook 2, pp. 9 and 10
MR-SW06	Moore's Run	4/10/00	7, p. 21; 82, Logbook 2, p.10

- Release Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics				
HRB-SD03	Benzo(a)anthracene	620	351	7, p. 182; 79
	Benzo(k)fluoranthene	630	351	7, p. 182; 79
	Benzo(a)pyrene	700	351	7, p. 182; 79
HRB-SD04	Benzo(a)anthracene	780	458	7, p. 182; 79
	Benzo(k)fluoranthene	760	458	7, p. 182; 79
	Benzo(a)pyrene	910	458	7, p. 182; 79
	Benzo(g,h,i)perylene	480	458	7, p. 182; 79
HRB-SD05	Benzo(a)anthracene	440	429	7, p. 182; 79
	Benzo(k)fluoranthene	440	429	7, p. 182; 79
	Benzo(a)pyrene	440	429	7, p. 182; 79
MR-SD06	Aroclor - 1260	96	44.6	7, p. 201; 79

Sample ID	Hazardous Substance	Sample Concentration* (mg/kg)	SQL (mg/kg)	Reference
Metals				
HR-SD04	Lead	117	0.79	7, p. 66; 79
MR-SD05	Lead	179 J (124)	0.98	7, p. 74; 79
	Zinc	201	6.5	7, p. 74; 79
MR-SD06	Lead	72.2 J (50)	0.92	7, p. 74; 79

Notes:

* * All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
* µg/kg Micrograms per kilogram
* mg/kg Milligrams per kilogram
* SQL Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

* J Analyte present; reported value may not be accurate or precise

- Release Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (µg/L)	CRDL (µg/L)	Reference
MR-SW04	Chromium	45.2	10	7, p. 75
	Lead	39.2	3	7, p. 75
	Zinc	126	20	7, p. 75
MR-SW06	Barium	294	200	7, p. 75
	Lead	20.5	3	7, p. 75
	Manganese	622	15	7, p. 75
	Zinc	90.6	20	7, p. 75

Notes:

CRDL Contract-required detection limit
µg/L Micrograms per liter

Attribution:

Source 1 was used as an open dump during the 1950s and 1960s. During this time the majority of Source 1, from Moore's Run to Herring Run, was covered in PSS/FO and PEM wetlands (Ref. 6, pp. 6 through 15; Ref. 8, pp. 1 and 18; Ref. 28; Ref. 25; Ref. 55; Ref. 81). As detailed in the discussions in the observed release section, waste containing hazardous substances was disposed of at Source 1. The dump was uncontained, and therefore hazardous substances in the waste material was able to migrate from the wetlands into Moore's Run and Herring Run. Documentation that this occurred is provided by the analytical results of samples collected from wetlands that remain at Source 1. In addition to the direct deposition of hazardous substances into wetlands located adjacent to Moore's Run and Herring Run, the hazardous substances documented at Source 1 would also have been in direct contact with surface waters during the numerous storm events and subsequent flooding documented to have occurred in this area (Ref. 15, p. 5; Ref. 18; Ref. 20; Ref. 63; Ref. 76; Ref. 86; Ref. 87). Finally, hazardous substances detected in the samples collected from Moore's Run and Herring Run downstream of Source 1 were also detected at elevated concentrations in samples collected from Source 1, documenting that a release, at least partially attributable to Source 1, to surface waters has occurred.

Other potential sources of hazardous substances located in the area of Source 1 include the stormwater outfalls observed discharging into Herring Run upstream of the source, and the effect of the tidal fluctuations noted in the area. As discussed in the observed release section, two upstream samples (HR-SD02 and HR-SD03), were collected from Herring Run during the 2000 ESI. To address the effect of the stormwater outfall discharges, the upstream sample with the highest concentration of hazardous substance detected was used to document as the background concentration. The potential tidal carry of hazardous substances that may be present downstream of Source 1 in Herring Run or the Back River cannot be satisfactorily established; however, the documentation that the hazardous substances detected in samples collected downstream of Source 1 were also detected at elevated concentrations in samples collected from Source 1 and from wetlands that remain at Source 1establishes that hazardous substances have migrated from Source 1 into adjacent wetlands and surface waters, and therefore Source 1 is at least partially attributable to the elevated concentrations of hazardous substances observed downstream of Source 1.

Hazardous Substances in the Release:

Aroclor-1260
Barium
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(a)pyrene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Chromium
Fluoranthene
Lead
Manganese
Phenanthrene
Zinc

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

The toxicity/persistence values for Source 1 are presented in section 4.1.2.2 of the HRS Documentation Record for the site.

Highest Toxicity/Persistence Value = 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
	TOTAL	**69.8***	

*Level II targets have been documented downstream of this source; therefore, a HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 32

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at Source 1.

Toxicity/Persistence/Bioaccumulation Factor Value = 5×10^8

4.1.3.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
	TOTAL	**69.8***	

* Level II targets have been documented downstream of this source; therefore, an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 <u>Waste Characteristics Factor Category Value</u>

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = $5x10^8$

Toxicity/Persistence Factor Value (10,000) × HWQ Value (100) = 1×10^6
1×10^6 × BPFV ($5x10^8$)= Waste Characteristics Product ($5x10^{14}$) (subject to maximum value at 1×10^{12})

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Sediment Samples - Herring Run

Herring Run has been established as a fishery along the entire 15-mile TDL (see Section 4.1.3.3 of the documentation record).

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. Hazardous substances detected in sediment samples collected downstream of all five sources were also detected at each individual source; therefore the release of these hazardous substances is partially attributable to each of the five sources at the 68th Street Dump. All of these samples are documented in the observed release section, Section 4.1.2.1.1 for the overall site. In addition sediment samples SED-9, HRB-SD03, HRB-SD04 and HRB-SD05 are located downstream of Source 1 and are provided to further document the actual contamination in the area of Herring Run downstream of Source 1. These samples are documented in the observed release Section 4.1.2.1 provided for Source 1 in this Appendix. The bioaccumulation potential factor values are documented in Section 4.1.3.2.1 of the documentation record of the entire site.

Sample ID	Downstream of Source No.	Hazardous Substance	Sample Concentration* (µg/kg)	Bioaccumulation Value
Organics				
SED-9	1	Benzo(b)fluoranthene	600	50,000
		Fluoranthene	880	5,000
HRB-SD03	1	Benzo(a)anthracene	620	50,000
		Benzo(k)fluoranthene	630	50,000
		Benzo(a)pyrene	700	50,000
HRB-SD04	1	Benzo(a)anthracene	780	50,000
		Benzo(k)fluoranthene	760	50,000
		Benzo(a)pyrene	910	50,000
HRB-SD05	1	Benzo(a)anthracene	440	50,000
		Benzo(k)fluoranthene	440	50,000
		Benzo(a)pyrene	440	50,000
BR-SD03	1,2,3,4,5	Benzo(a)anthracene	650	50,000
		Benzo(k)fluoranthene	620	50,000
		Benzo(a)pyrene	680	50,000

Sample ID		Hazardous Substance	Sample Concentration (mg/kg)	Bioaccumulation Value
Metals				
BR-SD04	1, 2, 3, 4, 5	Zinc	464 L	500
BR-SD06	1, 2, 3, 4, 5	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

Analysis of sediment sample BR-SD03 detected three hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) in Herring Run that were also detected in samples collected from Source 1.

Sample ID:	BR-SD03
Distance from PPE_{1A}:	8,204 feet
Reference:	Figures 2, 3, and 6 in Appendix A

Level II Fisheries

Hazardous substances that have bioaccumulation potential factor values of 500 or greater were detected in sediment samples collected from Herring Run. The extent of Level II fisheries that can be documented for the Source 1 site includes the distance from PPE_{1A} to sediment sampling location BR-SD03.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	8,204 feet

4.1.3.3.1 Food Chain Individual

A food chain individual factor value of 45 is assigned for Source 1 because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances that can be partially attributed to Source 1(Ref. 1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 Level II Concentrations

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Source 1 of the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is not scored and is assigned a contamination factor value of greater than zero.

Potential Human Food Chain Contamination Factor Value = > 0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

See Section 4.1.4.2.1 of the HRS Documentation Record for the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for Source 1. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = $5x10^8$

4.1.4.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Colgate Pay Dump/Original Landfill	69.8	No
	TOTAL	**69.8***	

* Level II targets have been documented downstream of this source; therefore, a documented HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 <u>Waste Characteristics Factor Category Value</u>

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculations are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = $1x10^6$

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1x10^6 \times 50,000 = 5x10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present at this location here that run contiguous to Herring Run (Ref. 8). Hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) were detected in this sample that were also detected in samples collected from Source 1.

Sample ID:	BR-SD03
Distance from PPE_{1A}:	8,240 feet
Reference:	Figures 2 and 3 in Appendix A

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

Wetlands - Source 1

The PPE of hazardous substances from Source 1 into surface waters is into the wetlands documented to have covered the majority of Source 1 prior to landfilling. The total length of wetlands documented at Source 1 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of historical wetlands documented at Source 1 (Ref. 81, Figure 3). This length, as calculated by the ArcView GIS 3.2 computer program, is 2.02 miles. The assigned HRS wetland rating for Source 1 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 <u>Potential Contamination</u>

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 74). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

<u>Chesapeake Bay</u>:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands not counted as Level II targets occur along the Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\ D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$SP_{\mathit{Back\ River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$SP_{\mathit{Chesapeake\ Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$SP_{\mathit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065

APPENDIX D

SOURCE 2 SCORING

SOURCE 2 SCORESHEETS
HORSESHOE LANDFILL

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP
SOURCE 2

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		50.00

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP
SOURCE 2

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)] 500	---	
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP
SOURCE 2

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Human Food Chain Threat			
	Likelihood of Release		
14.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics	1,000	1,000
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	–
	19d. Population [lines 19a + 19b + 19c]	b	0.03
20.	Targets [lines 18 + 19d]	b	45.03
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68TH STREET DUMP
SOURCE 2

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	25
	26c. Potential Contamination	b	0.0065
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	25.01
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	53.35
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT - SOURCE 2

Prior to landfilling, this source was covered with PEM wetlands, with an unnamed tributary to Herring Run flowing through these wetlands (Ref. 81, Figure 3). The majority of these wetlands were filled-in with landfilled materials. A wetland area, two streams and a pond remain in the center of Source 2 (Ref. 20; Ref. 81, Figure 8). Overland runoff from Source 2 flows from the topographic high where wastes were deposited, toward the center of the source, where wetlands, two streams, and a pond are located. The PPE of overland flow from Source 2 is the wetland area located in the center of Source 2 (PPE_2). These wetlands would discharge into the two streams and the pond located in this area. The two streams located here flow through these wetlands. One of the streams, located to the west, is not directly associated with the pond. The stream located to the east originates from a discharge point at the southeastern end of the pond. The streams flow southeast through the surrounding wetlands and converges to form one stream. The in-water segment for the 15-mile TDL for Source 2 is measured from the northern most point where the wetlands would discharge into the unnamed stream located to the east. This stream continues to flow for approximately 0.23 mile to the southeast until it discharges into Herring Run (Ref. 20) (Figure 4, 5, and 6, which can be found in Appendix A). Herring Run flows in an easterly direction for about 1 mile until it discharges into the Back River. The Back River flows approximately 8.5 miles until it discharges into the Chesapeake Bay. The 15-mile surface water pathway TDL ends in the Chesapeake Bay (see Figures 4 and 6 in Appendix A).

Available data indicates that all of the surface water bodies located along the 15-mile TDL are tidally-influenced (Ref. 16; Ref. 17; Ref. 18; Ref. 62; Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). Data does not exist to document the potential tidal carry of hazardous substances in the area of the site; however, during the April 6 through May 3, 2000 ESI, the sampling team observed and documented the tidal effect on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 81; Ref. 82, Logbook 2, p. 7).

4.1.2.1 Likelihood of Release - Source 2

<u>Direct Observation- Source 2</u>

- Basis for Direct Observation - Source 2

Historical aerial photographs document that prior to landfilling the entire area of Source 2 was covered in PEM wetlands (Ref. 81, Figure 3). These historical aerial photographs further document the filling in of 15.6 acres of wetlands with wastes (Ref. 81, pp. 15 and Figures 4 through 7). In addition, indications that hazardous substances in materials deposited at Source 2 were in direct contact with surface waters is supported by the fact that Source 2 is located within the 100-year flood plain (Ref. 86). Baltimore County is nationally identified as an area that suffers severe losses due to floods (Ref. 88, p. 3). Major floods have occurred in Baltimore County in October 1954, August 1955, August 1971, June 1972 and September 1975 (Ref. 64, p. 7; Ref. 87, p. 4). One of the most damaging floods recorded in the Baltimore area occurred on August 1 through 2, 1971. The flood waters recorded in the Back River basin were equivalent to, or in excess of, the 100-year flood interval (Ref. 87, p. 7). A second major flood occurred in Baltimore during Hurricane Agnes, from June 21 through 23, 1972. Flood peaks greater than 100-year intervals were recorded in Baltimore at this time (Ref. 87, p. 7). Because the entire area of Source 2 is located within the 100-year flood zone, the waste that contained hazardous substances, which documentation indicates was disposed of at Source 2 during the 1950s and 1960s, was in direct contact with these flood waters. The National Climatic Data Center (NCDC) has documented several, more recent storm events (June 1996, September 1999, and July 14, 2000) that have caused flash flooding in the area where the 68th Street Dump site is located (Ref. 63). In 1996, Hurricane Fran produced stream flows in Maryland among the highest ever seen and in 1999 heavy downpours (4.77 inches fell in the space of a few hours) led to major flooding in the Baltimore area (Ref. 89, p.1; Ref. 90, p. 1). Analytical results from the samples collected from Source 2 in 1986, 1993 and in April 2000 document that hazardous substances were present at Source 2 during these flash flood events. Additional evidence that the area of the 68th Street Dump is prone to flash floods is provided by observations of the banks of Herring Run and Moore's Run. The banks of these streams adjacent to the 68th Street Dump site show evidence of the increase in flow due to storm events (Ref. 15, p. 5; Ref. 18; Ref. 68; Ref. 69; Ref. 76). Exposed landfilled materials have been observed in Herring Run due to erosion of its bank (Ref. 69).

- Hazardous Substances in the Release - Source 2

Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of waste was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156, and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that covered all five source areas, including Source 2, during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these waste streams have been summarized in Table 1 in Appendix B.

EPA interviews conducted of former Robb Tyler employees and waste haulers provides evidence that wastestreams generated by the following companies were disposed of at Source 2: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; Signode Steel; GAF Materials; Armco; Koppers; General Motors; Crown, Cork, & Seal; Bruning Paint Company; SCM (Glidden Durkee, Co.); and the Baltimore Sun. Hazardous substances associated with the waste streams generated by these industries include trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

Samples Collected In Areas Historically Covered In Wetlands

Further evidence that hazardous substances were deposited directly into the wetlands of Source 2 is provided by laboratory analytical results of sampling events conducted at these sources. Samples were collected in 1993 by MDE, and in 2000 by the EPA Region 3 SATA team. Analytical results for the samples are provided as evidence of hazardous substance deposition into wetlands because the samples were collected at Source 2 in locations documented by historical aerial photographs to have at one time been covered in wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 6, pp. 6 through 15; Ref. 81). The waste disposed of at this source has not been removed; therefore, the analytical results summarized in the tables below document the hazardous substances present in the waste that was directly deposited into the wetlands of Source 2.

MDE Sample Results - 1993

In 1993, the MDE collected samples from Source 2. The area where these samples were collected was in an area historically covered in PEM wetlands (Ref. 81, Figure 3). These samples were analyzed in accordance with CLP protocols (Ref. 9, pp. 18, 20, and 47). Two samples, Soil-5 and Soil-6, were collected to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of the metals detected at Source 2. If the metal was detected in both background samples the sample with the higher concentration was used as the comparative sample. The table below presents the sample with the highest concentration of each hazardous substance detected at Source 2 (for a complete list of all contaminated samples see Section 2.2).

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Dieldrin	Soil-15	960 J	440	9, p. 168;79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Cadmium	Soil-15	10.8	ND	2.3	9, pp. 111, 113, 214, 231 and 232; 79
Chromium	Soil-15	417	29.3 J	4.6	9, pp. 111, 113, 214, 231 and 232; 79
Copper	Soil-15	798	25.8	11.5	9, pp. 111, 113, 214, 231 and 232; 79
Lead	Soil-15	723	201 J	1.38	9, pp. 111, 113, 214, 231 and 232; 79
Mercury	Soil-15	14.6	0.28	0.23	9, pp. 111, 113, 214, 231 and 232; 79
Nickel	Soil-15	25.1	[6.1]	18.4	9, pp. 111, 113, 214, 231 and 232; 79
Silver	Soil-15	47.3	ND	4.6	9, pp. 111, 113, 214, 231 and 232; 79
Zinc	Soil-15	658	77.0	9.2	9, pp. 111, 113, 214, 231 and 232;79

Notes:
CRDL Contract-required detection limit
CRQL Contract-required quantitation limit
ND Not detected above the detection limit
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise
[ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

<u>EPA SATA Team Sample Results - 2000</u>

Analytical results from samples collected as part of the ESI conducted in 2000 by the EPA SATA team provides further documentation of the hazardous substances disposed of into the wetlands of Source 2. These samples were collected from locations documented by historical aerial photographs to have at one time been covered with wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 12, pp. 14 through 29; Ref. 81). Sampling locations are provided in Figures 2 and 3 in Appendix A. These samples were analyzed for organic and inorganic parameters using CLP laboratory protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples analyzed for inorganic analysis were analyzed for total metals. To identify metal concentrations exceeding background levels, the metal concentrations detected at Source 2 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12). Only select analytical results are provided in the table below (for a complete list of all contaminated samples collected from Source 2 see Section 2.2, Source Characterization).

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
1,1'-Biphenyl	HSLF-WS15B	550 J	4,388	7, p. 95
2-Methylnaphthalene	HSLF-WS12B	180,000	155,327	7, p. 95
Acenaphhthene	HSLF-WS15B	4,800	4,388	7, p. 95
Anthracene	HSLF-WS15B	6,700	4,388	7, p. 96
Benzo(a)anthracene	HSLF-WS15B	12,000	4,388	7, p. 96
Benzo(b)fluoranthene	HSLF-WS15B	8,100	4,388	7, p. 96
Benzo(k)fluoranthene	HSLF-WS15B	9,700	4,388	7, p. 96
Benzo(a)pyrene	HSLF-WS15B	11,000	4,388	7, p. 96
Benzo(g,h,i)perylene	HSLF-WS15B	2,800 J	4,388	7, p. 96
Butylbenzylphthalate	HSLF-WS15B	4,400	4,388	7, p. 96
Carbazole	HSLF-WS03B	2,400 J	4,388	7, p. 94
Chrysene	HSLF-WS15B	12,000	4,388	7, p. 96
Dibenzofuran	HSLF-WS03B	3,000 J	12,011	7, p. 94
	HSLF-WS15B	3,800 J	4,388	7, p. 96
Dibenz(a,h)anthracene	HSLF-WS15B	1,700 J	4,388	7, p. 96
2,4-Dimethylphenol	HSLF-WS12B	6,000 J	155,327	7, p. 95
Fluoranthene	HSLF-WS15B	19,000	4,388	7, p. 96
Fluorene	HSLF-WS15B	4,800	4,388	7, p. 96
gamma-chlordane	HSLF-WS01A	32	2.3	7, p. 97
Indeno(1,2,3-cd)-pyrene	HSLF-WS01A	1,200	895	7, p. 94
Phenanthrene	HSLF-WS15B	19,000	4,388	7, p. 96

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Pyrene	HSLF-WS15B	17,000	4,388	7, p. 96
Aroclor-1242	HSLF-WS07C	1,300 + J	242.6	7, p. 97
Aroclor-1254	HSLF-WS07C	520 J	48.5	7, p. 97

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	HSLF-WS09B	23.1 L	ND	19.4	7, pp. 12, 33, 87
Arsenic	HSLF-WS03B	76.6	4.3 L	2.97	7, pp. 12, 32, 87
Barium	HSLF-WS07C	582	118.0	66.9	7, pp. 12, 32, 87
Cadmium	HSLF-WS09C	203,000 +J	ND	1.3	7, pp. 12, 33, 87
Chromium	HSLF-WS07C	175	27	3.3	7, pp. 12, 32, 87
Copper	HSLF-WS02B	667	33.7	5.9	7, pp. 12, 32, 87
Lead	HSLF-WS07B	3,740 J	101	0.9	7, pp. 12, 32, 87
Mercury	HSLF-WS03B	4.5	0.18	0.14	7, pp. 12, 32, 87
Nickel	HSLF-WS07C	211	16.3	13.4	7, pp. 12, 32, 87
Silver	HSLF-WS09B	8.6 K	ND	3.2	7, pp. 12, 33, 87
Zinc	HSLF-WS03B	10,800	142	5.9	7, pp. 12, 32, 87

Notes:
- CRDL Contract-required detection limit
- CRQL Contract-required quantitation limit
- ND Not detected above the detection limit
- mg/kg Milligrams per kilogram
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise
- K Analyte present; reported value may be biased high
- L Analyte present; reported value may be biased low
- \+ Reported value result of diluted sample

EPA SATA Team Wetland Sample Results - 2000

Although the majority of the wetlands documented to have at one time existed at Source 2 have been lost due to landfilling, a small wetland area remains in the center of the source (Ref. 20; Ref. 81, Figure 8). Documentation that waste containing hazardous substances were deposited directly into wetlands at Source 2 is documented by the laboratory analysis of samples collected from wetlands that remain at the source. The table below summarizes the samples collected during the 2000 ESI from these wetlands. These samples were analyzed under EPA's CLP (Ref. 7, p. 1). To identify metal concentrations exceeding background levels, the metal concentrations detected in these wetland samples were compared to the analytical results from a sediment sample collected from a wetland located outside the influence of the site. This sample was collected in a wetland area located along Herring Run, upstream of the 68th Street Dump site. The sample was collected by the EPA Region 3 START in February 2001 and was analyzed for the same parameters as the samples collected from Source 2 (TCL organics and TAL metals by an EPA CLP laboratory) (Ref. 65). All sampling locations are shown on Figures 2 and 3 in Appendix A.

Hazardous Substance	Evidence	Source No.	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics					
alpha-Clordane	HSLF-SD01	2	10	6.23	7, p. 101; 79

Hazardous Substance	Evidence	Source	Concentration* (mg/kg)	Background Concentration (SED-01) (mg/kg)	SQL (mg/kg)	Reference
Metals						
Chromium	HSLF-SD01	2	133 L	21.6	8.1	7, p. 34; 79
	HSLF-SD02	2	123 L	21.6	9.7	7, p. 34; 79
Copper	HSLF-SD01	2	116	28.5	20.1	7, p. 34; 79
	HSLF-SD02	2	117	28.5	24.1	7, p. 34; 79
Lead	HSLF-SD01	2	418 J (290)	49.8	2.4	7, p. 34; 79
	HSLF-SD02	2	456 J (317)	49.8	2.9	7, p. 34; 79
Nickel	HSLF-SD01	2	60.7	15.8	32.3	7, p. 34; 79
	HSLF-SD02	2	70.0	15.8	38.7	7, p. 34; 79
Zinc	HSLF-SD01	2	914	75.1	16.1	7, p. 34; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low

Chemical Analysis - Source 2

- MDE ESI Sample Results

During the 1993 MDE ESI, two samples were collected from the unnamed tributary that originates in the center of Source 2. No background sample can be collected from this stream because this stream originates on the source; therefore, concentrations of hazardous substances in these samples were compared to analytical results for a background sample collected in Redhouse Run. The sample collected in Redhouse Run was chosen as a suitable background sample because it was collected within the same environmental setting of the 68th Street site; it was collected during the same sampling event and analyzed by the same CLP laboratory as the release samples; and Redhouse Run is a similar size and flow as the unnamed tributary (Ref. 9, p. 18; Ref. 17; Ref. 20).

- Background Sample - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-4	Redhouse Run	Unknown	6/2/93 - 6/3/93	9, pp. 19, 153

- Background Sample - Aqueous

Sample ID	Sample Location	Date	Reference
SW-4	Redhouse Run	6/2/93 - 6/3/93	9, pp. 19, 115

- Background Concentrations - Sediments

Sample ID	Hazardous Substance	Sample* Concentration (ug/kg)	SQL (ug/kg)	Reference
Organics				
SED-4	Benzo(a)pyrene	ND	600	9, pp. 153, 277; 79
	Benzo(g,h,i)perylene	ND	600	9, pp. 153, 277; 79
	Chrysene	ND	600	9, pp. 153, 277; 79
	Phenanthrene	ND	600	9, pp. 153, 277; 79
	Pyrene	ND	600	9, pp. 153, 277; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
SED-4	Cadmium	ND	4.5	9, pp. 112, 218; 79
	Chromium	19.0 J (24.51)	8.9	9, pp. 112, 218; 79
	Copper	ND	22.3	9, pp. 112, 218; 79
	Lead	30.0	2.7	9, pp. 112, 218; 79
	Mercury	ND	0.45	9, pp. 112, 218; 79
	Nickel	ND	35.7	9, pp. 112, 218; 79
	Zinc	60.9	17.9	9, pp. 112, 218; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations shown in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

- Background Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (µg/L)	CRDL (µg/L)	Reference
SW-4	Chromium	ND	10	9, p. 115
	Copper	ND	25	9, p. 115
	Lead	3.7 B	3	9, pp.104, 115
	Manganese	126 B	15	9, pp. 104, 115
	Zinc	ND	20	9, p. 115

Notes:
CRDL Contact-required detection limit
µg/L Micrograms per liter
ND Not detected above the CRDL
Analytical Data Qualifiers:
B Not detected substantially above the level reported in laboratory or field blanks

- Release Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-1	Unnamed tributary to Herring Run	Unknown	6/3/93	9, pp. 19, 110, 171
SED-2	Unnamed tributary to Herring Run	Unknown	6/3/93	9, pp. 19, 110, 171

- Release Samples - Aqueous

Sample ID	Sample Location	Date	Reference
SW-1	Unnamed tributary to Herring Run	6/3/93	9, pp. 19, 114, 171

- Release Concentrations -Sediments

Sample ID	Hazardous Substance	Sample Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics				
SED-1	Benzo(a)pyrene	610	550	9, pp. 162, 320; 79
	Benzo(g,h,i)perylene	610	550	9, pp.162, 320; 79
	Chrysene	670	550	9, pp.162, 320; 79
	Phenanthrene	650	550	9, pp.162, 320; 79
	Pyrene	1,000	550	9, pp.162, 320; 79
SED-2	Benzo(a)pyrene	700	611	9, pp.162, 321; 79
	Chrysene	760	611	9, pp.162, 321; 79
	Phenanthrene	670	611	9, pp.162, 321; 79
	Pyrene	1,100	611	9, pp.162, 321; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
SED-1	Cadmium	3.4 K (2.41)	2.5	9, pp. 110, 204; 79
	Chromium	191	4.9	9, pp. 110, 204; 79
	Copper	189	12.3	9, pp. 110, 204; 79
	Lead	591	1.5	9, pp. 110, 204; 79
	Mercury	0.55	0.2	9, pp. 110, 204; 79
	Nickel	107	19.7	9, pp. 110, 204; 79
	Zinc	647	9.9	9, pp. 110, 204; 79
SED-2	Copper	42.7	3	9, pp. 110, 205; 79
	Lead	92.2	0.9	9, pp. 110, 205; 79
	Mercury	0.21	0.15	9, pp. 110, 205; 79
	Nickel	25.4	12.4	9, pp. 110, 205; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations presented in reference 79

Analytical Data Qualifiers:

K Analyte present; reported value may be biased high

- Release Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (µg/L)	CRDL (µg/L)	Reference
SW-1	Chromium	38.6	10	9, p. 114
	Copper	59.5	25	9, p. 114
	Lead	157	3	9, p. 114
	Manganese	476	15	9, p. 114
	Zinc	245	20	9, p. 114

Notes:
CRDL Contract-required detection limit
µg/L Micrograms per liter

- EPA SATA Team Sample Results - 2000

An observed release by chemical analysis can also be documented by the analytical results from samples collected during the ESI completed by the EPA Region 3 SATA team in 2000. Samples HSLF-SW/SD01 and HSLF-SW/SD02 were collected at the pond-wetland boundary. Samples HSLF-SD03 and HSLF-SD05 were collected in the northern branch of the unnamed tributary to Herring Run. To determine significance above background, the concentrations of hazardous substances detected in sediment samples HSLF-SD01 and HSLF-SD02 were compared to the analytical results from a sediment sample collected from a wetland located outside the influence of the site. This sample was collected in a wetland area located along Herring Run, upstream of the 68th Street Dump site. The sample was collected by the EPA Region 3 Superfund Technical Assistance and Response Team (START) in February 2001and was analyzed for the same parameters as the release samples (TCL organics and TAL metals by an EPA CLP laboratory) (Ref. 65). No aqueous sample was collected from this wetland area, therefore the analytical results for aqueous samples collected from the wetland area at Source 2 (HSLF-SW01 and HSLF-SW02) were compared to the analytical results for an aqueous sample collected from a wetland area located outside the influence of the 68th Street Dump site (see Figure 3 in Appendix A; Ref. 92). This aqueous sample, WTBSW-01 was collected at the same time as the release samples, and was analyzed by the same CLP laboratory (Ref. 7, pp. 1, 12, and 18).

- Background Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-01	Wetland	0-6	2/1/01	65, p. 4
RHRSD-01	Redhouse Run	0-6	5/3/00	7, p. 20; 82, Logbook 1, p. 5 and Logbook 2, p. 39

-Background Samples - Aqueous

Sample ID	Sample Location	Date	Reference
WTBSW-01	Wetland	5/17/00	7, p. 18; 75

- Background Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
SED-1	Aroclor-1254	ND	64.1	65, p. 26; 79
RHRSD-01	Aroclor-1254	ND	40.7	7, p. 215; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
SED-1	Barium	103	74	65, p. 5; 79
	Chromium	21.6	3.7	65, p. 5; 79
	Copper	28.5	9.3	65, p. 5; 79
	Lead	49.8	1.1	65, p. 5; 79
	Nickel	15.8	14.8	65, p. 5; 79
	Zinc	75.1	7.4	65, p. 5; 79
RHRSD-01	Barium	ND	51.9	7, p. 80; 79
	Chromium	10.9	2.6	7, p. 80; 79
	Lead	18.1 B	0.8	7, p. 80; 79
	Nickel	ND	10.4	7, p. 80; 79
	Zinc	51.8	5.2	7, p. 80; 79

Notes:
- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- ND Not detected above the SQL
- SQL Sample quantitation limit; SQL calculations presented in reference 79

Analytical Data Qualifiers:
- B Not detected substantially above the level reported in laboratory or field blanks
- [ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate

- Background Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (μg/L)	CRDL (μg/L)	Reference
WTBSW-01	Chromium	ND	10	7, p. 85
	Lead	ND	3	7, p. 85
	Zinc	ND	20	7, p. 85

Notes:
B Not detected substantially above the level reported in laboratory or field blanks
CRDL Contract-required detection limit
μg/L micrograms per liter
ND Not detected above the contract-required detection limit

- Release Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
HSLF-SD01	Pond/wetland area in center of Source 3	0-6	4/6/00	7, p. 12; 18; 82, Logbook 1, p. 5
HSLF-SD02	Pond/wetland area in center of Source 3	0-6	4/6/00	7, p. 12; 18; 82, Logbook 1, pp. 5 and 6
HSLF-SD03	Unnamed tributary to Herring Run located in center of Source 3	0-6	4/6/00	7, p. 12; 18; 82, Logbook 1, pp. 5 and 6
HSLF-SD05	Unnamed tributary to Herring Run located in center of Source 3	0-6	4/6/00	7, p. 13; 18; 82, Logbook 1, pp. 5 and 7

- Release Samples - Aqueous

Sample ID	Sample Location	Date	Reference
HSLF-SW01	Pond/wetland area in center of Source 3	4/6/00	7, p. 13; 82, Logbook 1, p. 5
HSLF-SW02	Pond/wetland area in center of Source 3	4/6/00	7, p. 13; 82, Logbook 1, p. 6

- Release Concentrations - Sediments

Sample ID	Hazardous Substance	Sample* Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
HSLF-SD05	Aroclor-1254	52	47.1	7, p. 101; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
HSLF-SD01	Barium	515	161.3	7, p. 34; 79
	Chromium	133 L	8.1	7, p. 34; 79
	Copper	116	8.1	7, p. 34; 79
	Lead	418 J (290)	2.4	7, p. 34; 79
	Nickel	60.7	32.3	7, p. 34; 79
	Zinc	914	16.1	7, p. 34; 79
HSLF-SD02	Chromium	123 L	9.7	7, p. 34; 79
	Copper	117	9.7	7, p. 34; 79
	Lead	456 J (317)	2.9	7, p. 34; 79
	Nickel	70.0	38.7	7, p. 34; 79
HSLF-SD03	Barium	208	86.8	7, p. 34; 79
	Chromium	72.0 L	4.3	7, p. 34; 79
	Lead	203 J (141)	1.3	7, p. 34; 79
	Nickel	42.6	17.4	7, p. 34; 79
	Zinc	294	8.7	7, p. 34; 79
HSLF-SD05	Zinc	395	6.1	7, p. 34; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the quantitation or detection limit
SQL Sample quantitation limit; calculations are presented in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
L Analyte present; reported value may be biased low

- Release Concentrations - Aqueous

Sample ID	Hazardous Substance	Sample Concentration (µg/L)	CRDL (µg/L)	Reference
HSLF-SW01	Chromium	22.4	10	7, p. 35
	Lead	109	3	7, p. 35
	Zinc	133	20	7, p. 35
HSLF-SW02	Lead	97.9	3	7, p. 35

Notes:

B	Not detected substantially above the level reported in laboratory or field blanks
CRDL	Contract-required detection limit
µg/L	micrograms per liter

Attribution - Source 2

As documented in the source description section for Source 2, Robb Tyler disposed of wastes that contained hazardous substances at Source 2. Historical aerial photographs document the disposal of these wastes. Hazardous substances detected in the release samples were also detected at elevated levels from samples collected from the source and in wetland and stream samples collected from areas that receive rainfall runoff from Source 2 (Ref. 20). A radio facility consisting of a transmitter station building and associated antenna towers were also located in the area of Source 2. This radio facility is first visible on the May 18, 1964 aerial photograph of the area (Ref. 6, p. 12 and 13). At one time this building contained PCBs (Ref. 9, p. 4). A Phase I Environmental Site Assessment was performed in 1991 for this building and associated transmitter sites. The interiors of six transmitter towers were inspected. No evidence of previous spills or leaks of PCB-containing fluids was observed at this time (Ref. 9, pp. 63 through 68). No other potential sources of the hazardous substances documented in the release have been identified at this time.

Hazardous Substances in the Release

Aroclor-1254
Barium
Benzo(a)pyrene
Benzo(g,h,i)perylene
Cadmium
Chromium
Chrysene
Copper
Lead
Manganese
Mercury
Nickel
Phenanthrene
Pyrene
Zinc

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

See Section 4.1.2.2 of the HRS documentation record for the toxicity/persistence factor values for all hazardous substances detected at Source 2.

Highest Toxicity/Persistence Value = 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
2	Horseshoe Landfill	20.1	No
	TOTAL	**20.1***	

* Level II targets have been documented downstream of this source; therefore, an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule Section 2.4.3.1 (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 32

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

See Section 4.1.2.2 of the HRS documentation Record for the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at Source 2.

Toxicity/Persistence/Bioaccumulation Factor Value = 5 X 10^8

4.1.3.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
2	Horseshoe Landfill	20.1	No
	TOTAL	**20.1**	

* Level II targets have been documented downstream of this source; therefore, an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = 5×10^8

Toxicity/Persistence Factor Value (10,000) × HWQ Value (100) = 1×10^6
$1 \times 10^6 \times$ BPFV (5×10^8) = Waste Characteristics Product (5×10^{14}) (subject to maximum limit value at 1×10^{12})

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Herring Run has been established as a fishery along the entire 15-mile TDL (see Section 4.1.3.3 of the documentation record).

Sediment Samples - Herring Run

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. Hazardous substances detected in sediment samples collected downstream of all five sources were also detected at each individual source; therefore the release of these hazardous substances is partially attributable to each of the sources identified at the 68th Street Dump site. These samples are documented in the observed release section, Section 4.1.2.1.1 for the overall site. The bioaccumulation potential factor values are also provided in Section 4.1.3.2.1 of the documentation record of the entire site.

Sample ID	Downstream of Source No.	Hazardous Substance	Sample Concentration* (µg/kg)	Bioaccumulation Value
Organics				
BR-SD03	1,2,3,4,5	Benzo(a)anthracene	650	50,000
		Benzo(k)fluoranthene	620	50,000
		Benzo(a)pyrene	680	50,000
Sample ID		**Hazardous Substance**	**Sample Concentration (mg/kg)**	**Bioaccumulation Value**
Metals				
BR-SD04	1, 2, 3, 4, 5	Zinc	464 L	500
BR-SD06	1, 2, 3, 4, 5	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

An observed release of the hazardous substance benzo(a)pyrene was separately documented for Source 2. Sediment sample BR-SD03 detected benzo(a)pyrene in the Herring Run fishery downstream of PPE_2.

Sample ID:	BR-SD03
Distance from PPE_2:	3,452 feet
Reference:	Figures 2, 3, and 6 in Appendix A

Level II Fisheries

A hazardous substance that has a bioaccumulation potential factor value of 500 or greater was detected in a sediment sample collected from Herring Run. The extent of Level II fisheries that can be documented for Source 2 includes the distance from where the unmanned tributary that receives drainage from Source 2 discharges into Herring Run to sediment sampling location BR-SD03.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	3,452 feet

4.1.3.3.1 Food Chain Individual

A food chain individual factor value of 45 is assigned for Source 2 site because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances that can be partially attributed to migration from Source 2 (Ref. 1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 Level II Concentrations

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Source 2 the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is not scored and is assigned a contamination factor value of greater than 0.

Potential Human Food Chain Contamination Factor Value = >0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 <u>Ecosystem Toxicity/Persistence/Bioaccumulation</u>

See Section 4.1.4.2.1 of the HRS Documentation Record for the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for Source 2. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = $5x10^8$

4.1.4.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
2	Horseshoe Landfill	20.1	No
	TOTAL	**20.1***	

* Level II targets have been documented downstream of this source; therefore, an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculations are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = 1×10^6

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1 \times 10^6 \times 50{,}000 = 5 \times 10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present at this location that run contiguous to Herring Run (Ref. 81). Hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) that were detected in this sample were also detected in samples collected from Source 2.

Sample ID: BR-SD03
Distance from unnamed tributary discharge into Herring Run: 3,452 feet
Reference: Figures 2 and 3 in Appendix A

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

Total Length of Wetlands - Source 2

The PPE of hazardous substances from Source 2 into surface waters is into the wetlands documented to have covered the entire area of Source 2 prior to landfilling. The total length of wetlands documented at Source 2 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 2. This length is 0.96 mile; therefore, the assigned HRS wetland rating for Source 2 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 Potential Contamination

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 75). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

Chesapeake Bay:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands not counted as Level II targets occur along the Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\ D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$\boldsymbol{SP}_{\textit{Back River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$\boldsymbol{SP}_{\textit{Chesapeake Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$\boldsymbol{SP}_{\textit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065

APPENDIX E

SOURCE 3 SCORING

SOURCE 3 SCORESHEETS
ISLAND LANDFILL

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP
SOURCE 3

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		50.00

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP
SOURCE 3

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)] 500	---	
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP
SOURCE 3

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Human Food Chain Threat			
	Likelihood of Release		
14.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics	1,000	1,000
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	–
	19d. Population [lines 19a + 19b + 19c]	b	0.03
20.	Targets [lines 18 + 19d]	b	45.03
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (Continued) 68TH STREET DUMP SOURCE 3

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	25
	26c. Potential Contamination		b
0.0065			
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	25.01
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	53.35
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT - SOURCE 3

Prior to landfilling, the entire area of Source 3 was covered in E2EM wetlands located within Herring Run; therefore the PPE is into these wetlands (Ref. 81, p. 15 and Figure 3). Because the entire source is located in surface waters, the in-water segment of the surface water pathway TDL was determined from the farthest upstream and downstream points where the island would discharge into Herring Run (PPE_{3A}, $PPE_{3B,}$ PPE_{3C} and PPE_{3D}). From the northern portion of the source, Herring Run flows from the farthest upstream PPEs (PPE_{3A} and PPE_{3B}) for about 0.5 mile to the southeast before discharging into the Back River. The Back River flows for about 8.5 miles before discharging into the Chesapeake Bay. The 15-mile surface water pathway TDL ends in the Chesapeake Bay (see Figures 5 and 6 in Appendix A).

Available data indicates that all of the surface waters located along the 15-mile TDL are tidally influenced (Ref. 16; Ref. 17; Ref. 18; Ref. 62; Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). Data does not exist to document the potential tidal carry of hazardous substances in the area of the site; however, during the April 6 through May 3, 2000 ESI, the sampling team observed and documented the tidal effect on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 18; Ref. 82, Logbook 2, p. 7).

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release - Source 3

Direct Observation - Source 3

- Basis for Direct Observation - Source 3

Source 3 is an approximately 3.8-acre area where Robb Tyler began disposing of waste sometime in the late 1950s or early 1960s (Ref. 8, p. 20; Ref. 9, p. 5; Ref. 12, p. 27; Ref. 23). Aerial photographs document waste disposal activities at Source 3 beginning in 1966 and continuing until 1973 (Ref. 12, pp. 22 through 29; Ref. 81). Historical aerial photographs document that at the time the landfilling was actively occurring the entire area of Source 3 was vegetated with E2EM wetlands (Ref. 81, p. 12).

Source 3 forms an island within Herring Run; therefore waste containing hazardous substances disposed of here would also be in direct contact with the waters of Herring Run during flood events. The entire 68th Street Dump lies within the 100-year flood plain and Baltimore County is nationally identified as an area that suffers severe losses due to floods (Ref. 86; Ref. 88, p. 3). Major floods have occurred in Baltimore County in October 1954, August 1955, August 1971, June 1972 and September 1975 (Ref. 64, p. 7; Ref. 87, p. 4). One of the most damaging floods recorded in the Baltimore area occurred on August 1 through 2, 1971. The flood waters recorded in the Back River basin were equivalent to, or in excess of, the 100-year flood interval (Ref. 87, p. 7). A second major flood occurred in Baltimore during Hurricane Agnes, from June 21 through 23 1972. Flood peaks greater than 100-year intervals were recorded in Baltimore at this time (Ref. 87, p. 7). Because the entire area of Source 3 is located within the 100-year flood zone, the waste that contained hazardous substances, which documentation indicates was disposed of at Source 3, was in direct contact with these flood waters. The National Climatic Data Center (NCDC) has documented several, more recent storm events (June 1996, September 1999, and July 14, 2000) that have caused flash flooding in the area where the 68th Street Dump site is located (Ref. 63). In 1996, Hurricane Fran produced stream flows in Maryland among the highest ever seen and in 1999 heavy downpours (4.77 inches fell in the space of a few hours) led to major flooding in the Baltimore area (Ref. 89, p.1; Ref. 90, p. 1). Analytical results from the samples collected from Source 3 in 1985 and in April 2000 document that hazardous substances were present at Source 3 during these flash flood events. Additional evidence that the area of the 68th Street Dump is prone to flash floods is provided by observations of the banks of Herring Run and Moore's Run. The banks of these streams adjacent to the 68th Street Dump site show evidence of the increase in flow due to storm events (Ref. 15, p. 5; Ref. 18; Ref. 68; Ref. 69; Ref. 76). Exposed landfilled materials have been observed in Herring Run due to erosion of its bank (Ref. 69).

- Hazardous Substances in the Release - Source 3

Documentation that the materials deposited in the wetlands of Source 3 contained hazardous substances is provided by analytical results for samples collected from drums found at Source 3. MD WMA completed a reconnaissance of Source 3 in February 1985. Numerous drums were observed embedded in the ground at this time (Ref. 8, p. 3). MD WMA collected samples from four of these drums. The samples were analyzed for total metals, purgeable halocarbons (using EPA Method 601), and purgeable aromatics (using EPA Method 602) (Ref. 8, p. 59 and pp. 113 through 121). The table below summarizes the results for the laboratory analysis of these samples.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Toluene	IE 002A	200	8, p. 114
	IE 004A	2,800,000	8, p. 120
Ethylbenzene	IE 002A	310	8, p. 114
	IE 004A	16,780,000	8, p. 120
Xylenes	IE 002A	270	8, p. 114
	IE 004A	92,270,000	8, p. 120
Total Purgeable Halocarbons	IE 002A	4,000	8, p. 114
Metals		**(mg/kg)**	
Arsenic	IE 001B	7.46	8, p. 112
Cadmium	IE 001B	0.89	8, p. 112
	IE 002B	89.8	8, p. 115
Chromium	IE 001B	48.3	8, p. 112
	IE 002B	1,855	8, p. 115
Lead	IE 002B	8,105	8, p. 115
Nickel	IE 001B	2,759	8, p. 112
	IE 002B	781	8, p. 115
	IE 004B	24.7	8, p. 121
Zinc	IE 001B	51,232	8, p. 112
	IE 002B	817	8, p. 115
	IE 003B	245	8, p. 118

Notes:
mg/kg Milligrams per kilogram
µg/kg Micrograms per kilogram

Samples of material from drums found at Source 3 were also collected by EPA Region 3's TAT during an emergency response at Source 3 in July 1985. The samples were analyzed for VOCs. The table below summarizes the results of the analysis of these samples.

Hazardous Substance	Evidence	Concentration (µg/kg)	Reference
Organics			
Acetone	Station #1	3,100 J	21, p. 1
	Station #4	7,700	21, p. 4
	Station #6	33,000	21, p. 7
Benzene	Station # 2	68,000	21, p. 2
	Station #6	26,000	21, p. 7
2-Butanone	Station #5	3,100	21, p. 5
	Station #6	6,000	21, p. 7
1,1-Dichloroethane	Station #2	1,400 J	21, p. 2
Toluene	Station # 1	90,000	21, p. 1
	Station #2	>1,400,000	21, p. 2
	Station #4	41,000	21, p. 4
1,1,1-Trichloroethane	Station #4	8,700	21, p. 4
	Station #5	1,600	21, p. 5
	Station #6	13,000	21, p. 7
1,1,1-Trichloroethane	Station #2	10,000	21, p. 2
Trichloroethylene	Station #2	730 J	21, p. 2
Ethylbenzene	Station # 2	>6,000,000	21, p. 2
	Station #3	1,300	21, p. 3
	Station #4	15,000	21, p. 4
	Station #5	2,800	21, p. 5
Xylenes	Station #1	150,000	21, p. 1
	Station #3	6,800	21, p. 3
	Station #4	80,000	21, p. 4
	Station #5	14,000	21, p. 5
	Station #6	18,000	21, p. 7

Notes:
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise

<u>Chemical Analysis - Source 3</u>

Source 3 is located downstream of Sources 1, 2, and 4; therefore a separate observed release by chemical analysis was not documented for this source individually; however all of the hazardous substances detected in the release samples documented in Section 4.1.2.1.1, Observed Release in the HRS documentation record for the entire site were also detected at Source 3. Source 3 is therefore partially attributable to the release of these hazardous substances.

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

Source 3 has a surface water containment value greater than zero; therefore, all of the hazardous substances detected at Source 3 are presented in the table below.

Highest Toxicity/Persistence Value = 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
3	Island Landfill	7.56	No
	TOTAL	**7.56***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2) = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule Section 2.4.3.1 (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 32

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at Source 3.

Toxicity/Persistence/Bioaccumulation Factor Value = 5×10^8

4.1.3.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
3	Island Landfill	7.56	No
	TOTAL	**7.56***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = 5×10^8

Toxicity/Persistence Factor Value (10,000) × HWQ Value (100) = 1×10^6
1×10^6 × BPFV (5×10^8) = Waste Characteristics Product (5×10^{14}) (subject to maximum value of 1×10^{12})

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Herring Run has been established as a fishery along the entire 15-mile TDL (see Section 4.1.3.3 of the documentation record).

Sediment Samples - Herring Run

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. Hazardous substances detected in sediment samples collected downstream of all five sources were also detected at each individual source; therefore the release of these hazardous substances is partially attributable to each of the sources identified at the 68th Street Dump site. All of the samples shown below are documented in the observed release section, Sections 4.1.2.1.1 for the overall site. The bioaccumulation potential factor values are documented in Section 4.1.3.2.1 of the documentation record of the entire site.

Sample ID		Hazardous Substance	Sample Concentration (mg/kg)	Bioaccumulation Value
Metals				
BR-SD04	1, 2, 3, 4, 5	Zinc	464 L	500
BR-SD06	1, 2, 3, 4, 5	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

Analytical Data Qualifiers:

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

Analysis of sediment samples BR-SD04 and BR-SD06 detected a hazardous substance (zinc) in Herring Run that was also detected in samples collected from the drums dumped into the wetlands of Source 3.

Sample ID:	BR-SD06
Distance from PPE_{3B}:	1,700 feet
Reference:	Figures 2, 3, and 6 in Appendix A

Level II Fisheries

A hazardous substance that have bioaccumulation potential factor values of 500 or greater was detected in sediment samples collected from Herring Run. The extent of Level II fisheries that can be documented for Source 3 includes the distance from PPE_{3B} to sediment sampling location BR-SD06.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	1,700 feet

4.1.3.3.1 <u>Food Chain Individual</u>

A food chain individual factor value of 45 is assigned for Source 3 because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances that can be partially attributed to migration from Source 3 (Ref. 1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 <u>Level II Concentrations</u>

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Source 3 of the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is not scored and is assigned a contamination factor value of greater than 0.

Potential Human Food Chain Contamination Factor Value = >0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

See Section 4.1.4.2.1 of the HRS Documentation Record for the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for Source 3. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = 5×10^8

4.1.4.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
3	Island Landfill	7.56	No
	TOTAL	**7.56***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculations are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = 1×10^6

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1 \times 10^6 \times 50{,}000 = 5 \times 10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present at this location that run contiguous to Herring Run (Ref. 81). A hazardous substance (lead) was detected in this sample that was also detected in samples collected from drums dumped into the wetlands of Source 3.

Sample ID:	BR-SD03
Distance from PPE_{3B}:	2,770 feet
Reference:	Figures 2 and 3 in Appendix A

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

Total Length of Wetlands - Source 3

The PPE of hazardous substances from Source 3 into surface waters is into the wetlands documented to have covered the entire area of Source 3 prior to landfilling. The total length of wetlands documented at Source 3 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 3. This length is 0.45 mile; therefore, the assigned HRS wetland rating for Source 3 is 25 (Ref. 1, Table 4-24, p. 51625; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 Potential Contamination

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 75). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

Chesapeake Bay:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands not counted as Level II targets occur along the Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\,D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$SP_{\textit{Back River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$SP_{\textit{Chesapeake Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$SP_{\textit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065

APPENDIX F

SOURCE 4 SCORING

SOURCE 4 SCORESHEETS
REDHOUSE RUN LANDFILL

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP
SOURCE 4

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		30,000

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP
SOURCE 4

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)]	500	---
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP
SOURCE 4

Factor Categories and Factors Assigned		**Maximum Value**	**Value Assigned**
Human Food Chain Threat			
	Likelihood of Release		
14.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics	1,000	320
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	–
	19d. Population [lines 19a + 19b + 19c]	b	0.03
20.	Targets [lines 18 + 19d]	b	45.03
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	96.06

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68TH STREET DUMP
SOURCE 4

Factor Categories and Factors Assigned		Maximum Value	Value Assigned
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	25
	26c. Potential Contamination	b	0.0065
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	0.0065
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	25.00
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT - SOURCE 4

Prior to landfilling, the entire area of Source 4 was covered in PSS/FO wetlands located adjacent to Redhouse Run; therefore the PPE of hazardous substances from Source 4 is in these wetlands. (Ref. 81, p. 15 and Figure 3). The in-water segment of the surface water TDL was determined from a point on Redhouse Run adjacent to Source 4 (PPE_4). From the PPE in Redhouse Run (PPE_4) the stream flows to the southeast for approximately 0.25 mile until it discharges into Herring Run. Herring Run flows for about 0.70 mile until it discharges into the Back River. The remainder of the 15-mile TDL is outlined in the last paragraph of this section. The Back River flows in an eastwardly direction for approximately 8.5 miles until it discharges into the Chesapeake Bay. The 15-mile surface water pathway TDL ends in the Chesapeake Bay (see Figures 5 and 6 in Appendix A). Available data indicates that all of the surface water bodies located along the 15-mile TDL are tidally influenced (Ref. 16; Ref. 17; Ref. 18; Ref. 62; Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). Data does not exist to document the potential tidal carry of hazardous substances in the area of the site; however, during the April 6 through May 3, 2000 ESI, the sampling team observed and documented the tidal effect on Herring Run (Ref. 82, Logbook 2, pp. 7, 26, 28, 35, and 38). The uppermost reach of the tidal effect was observed at the second overpass of the Interstate 95 highway (Ref. 81; Ref. 82, Logbook 2, p. 7).

4.1.2.1 Likelihood of Release - Source 4

4.1.2.1.1 Observed Release - Source 4

Direct Observation - Source 4

- Basis for Direct Observation - Source 4

Prior to landfilling, Source 4 was completely covered in PSS/FO wetlands that were contiguous with Redhouse Run. As documented by the historical aerial photographs Robb Tyler disposed of wastes directly into these wetlands (Ref. 81). In addition, Source 4 is located within the 100-year flood plan in an area (Baltimore County) that has been nationally identified as an area that suffers severe losses due to floods (Ref. 86; Ref. 88, p. 3). Major floods have occurred in Baltimore County in October 1954, August 1955, August 1971, June 1972, and September 1975 (Ref. 64, p. 7; Ref. 87, p. 4). One of the most damaging floods recorded in the Baltimore area occurred on August 1 through 2, 1971. The flood waters recorded in the Back River basin were equivalent to, or in excess of, the 100-year flood interval (Ref. 87, p. 7). A second major flood occurred in Baltimore during Hurricane Agnes, from June 21 through 23, 1972. Flood peaks greater than 100-year intervals were recorded in Baltimore at this time (Ref. 87, p. 7). Because the entire area of Sources 1, 2, 3, 4, and 5 are located within the 100-year flood zone, the waste that contained hazardous substances, which documentation indicates was disposed of at these sources, was in direct contact with these flood waters. The National Climatic Data Center (NCDC) has documented several, more recent storm events (June 1996, September 1999, and July 14, 2000) that have caused flash flooding in the area where the 68th Street Dump site is located (Ref. 63). In 1996, Hurricane Fran produced stream flows in Maryland among the highest ever seen and in 1999 heavy downpours (4.77 inches fell in the space of a few hours) led to major flooding in the Baltimore area (Ref. 89, p.1; Ref. 90, p. 1).

- Hazardous Substances in the Release

During a photographic survey conducted by MD WMA on June 22, 1984, three 55-gallon drums were observed protruding from the ground at Source 4 (Ref. 32; Ref. 33). After the discovery of the drums MD WMA returned to Source 4 on June 28, 1984 to complete an investigation of the area. At this time it was determined that one of the estimated ten drums found at the source was full. Analytical results from a sample of the drum contents determined that the full drum contained paint sludge (Ref. 32). Robb Tyler's son, Alfred Tyler, the owner of the property at the time, secured the removal of 10 drums from Source 4 in July 1984 (Ref. 8, p. 2; Ref. 9, p. 5; Ref. 32; Ref. 33; Ref. 35). Additional evidence that hazardous wastes were disposed of at Source 4 is provided in testimony given to EPA investigators from a former employee of the Koppers Company. He stated that he helped dispose of 55-gallon drums of liquid solvent generated from the Koppers Company onto the ground in the area of Source 4 (Ref. 10, pp. 119, 120 and 122a). Also, the testimony of a former Robb Tyler truck driver indicates that wastes generated by General Motors were disposed of at Source 4. During his testimony, the former driver stated that he normally disposed of wastes from General Motors in a pit at Source 5; however he recalled that at one time when this area was closed the waste was dumped "over at Rob Tyler's office" (Ref. 83, pp. 85 and 86). Robb Tyler's office was located near Source 4 (Ref. 10, pp.108 and 166). The wastestream generated by General Motors and known to have been disposed of by Robb Tyler consisted of 55-gallon drums of industrial wastewater treatment sludge; incinerator ash; paint sludge; solvents; waste oils; and styrofoam (Ref. 84, pp. 10 through 18) (Table 1, which can be found in Appendix B).

As detailed below, additional evidence of hazardous substances deposited into the wetlands of Source 4 is provided by laboratory analytical results of samples collected from this source. Wastes were encountered at Source 4 by MDE personnel in 1994 during collection of soil samples. Types of wastes encountered included fly ash and material with a strong oily odor, possibly associated with roofing waste (Ref. 60, p. 9). Trash, oily smells, and ash were also encountered at Source 4 during the test pit excavations conducted in 2000 (Ref. 82, Logbook 1, p. 42). Testimonies of former waste haulers document that fly ash from Baltimore Gas and Electric was deposited at all five sources that comprise the 68th Street Dump site (Ref. 10, pp. 7, 14, 17, 25, 27, 32, 33, 42, 4, 49, 58, 94, 96, 113, 114, 118a, 118b, 126, 130, 132, 145, 146, 149, 156, 161, 162, 164, 165 166).

Additional evidence of the presence of hazardous substances at Source 4 is documented by the results of four sampling events. Samples were collected from Source 4 in 1986 by the EPA Region 3 FIT, in 1993 and 1994 by MDE, and in 2000 by the EPA Region 3 SATA team. The tables below present the analytical results from each of these sampling events.

EPA FIT Sample Results - 1986

The EPA Region 3 FIT collected four samples from Source 4 during an SI conducted in 1986. Soil sample C9223/MC4964 was collected from soils where drums were removed in 1984, soil sample C9249/MC4962 was collected from a pile of fly ash (generated from the City of Baltimore incinerator) located northwest of the former Robb Tyler office building, sample C9248/MC4950 was collected from soils determined by BFI to exhibit the characteristic of reactivity, and C9250/MC4963 was collected from a drainage ditch that intersects Herring Run (Ref. 13, pp. Section 6 and Figure 3; Ref.14, pp. 2, 8, 14, 15, and 16). The samples collected during the SI were analyzed for organic and inorganic parameters by an EPA CLP laboratory. The analytical results for these samples are shown in the table below. No background samples were collected during the SI; therefore, the metal concentrations detected in the samples have been compared to the concentrations in the background sample collected by the EPA Region 3 SATA team during the ESI completed in 2000.

Hazardous Substance	Evidence	Concentration (µg/kg)	CRQL* (µg/kg)	Reference
Organics				
Bis(2-ethylhexyl) phthalate	C9223	611,129 J	330	13, p. 6-5
	C9249	7,656 J	330	13, p. 6-5
	C9250	10,388 J	330	13, p. 6-5
Pyrene	C9223	9,140 J	330	13, p. 6-5
	C9250	4,427 K	330	13, p. 6-5
Phenanthrene	C9250	2,938 J	330	13, p. 6-5
Chrysene	C9250	3,166 J	330	13, p. 6-5
Fluoranthene	C9223	1,644 K	330	13, p. 6-5

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	CRDL* (mg/kg)	Reference
Metals					
Aluminum	MC4962	31,250	8,800	200	13, p. 6-6; 7, pp. 12 and 87
Arsenic	MC4950	13	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	45	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
	MC4964	26	4.3 L	2	13, p. 6-6; 7, pp. 12 and 87
Cadmium	MC4950	6.7	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4963	1.45	ND	1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	38	ND	1	13, p. 6-6; 7, pp. 12 and 87
Chromium	MC4950	260	27	2	13, p. 6-6; 7, pp. 12 and 87
	MC4962	280	27	2	13, p. 6-6; 7, pp. 12 and 87
Copper	MC4950	338	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4962	4,490	33.7	5	13, p. 6-6; 7, pp. 12 and 87
	MC4964	690	33.7	5	13, p. 6-6; 7, pp. 12 and 87
Lead	MC4950	622	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4962	2,850	101	0.6	13, p. 6-6; 7, pp. 12 and 87
	MC4964	1,960	101	0.6	13, p. 6-6; 7, pp. 12 and 87
Mercury	MC4950	3.2	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
	MC4964	0.8	0.18	0.1	13, p. 6-6; 7, pp. 12 and 87
Nickel	MC4962	1,100	16.3	8	13, p. 6-7; 7, pp. 12 and 87
	MC4964	64	16.3	8	13, p. 6-7; 7, pp. 12 and 87
Zinc	MC4950	790	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4962	23,900	142	4	13, p. 6-7; 7, pp. 12 and 87
	MC4964	1,760	142	4	13, p. 6-7; 7, pp. 12 and 87

Notes:

- • The sample quantitation limit cannot be determined with the available data.
- CRDL Contract-required detection limit
- CRQL Contract-required quantitation limit
- ND Not detected above the detection limit
- mg/kg Milligrams per kilogram
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

- J Analyte present; reported value may not be accurate or precise
- K Analyte present; reported value may be biased high
- L Analyte present; reported value may be biased low

MDE Sample Results - 1993

MDE collected one composite soil sample from Source 4 during the ESI conducted in 1993. This sample was analyzed for TCL organic and TAL inorganic compounds in accordance with EPA CLP protocols (Ref. 9, p. 18). Two samples, Soil-5 and Soil-6, were collected during the ESI to establish background concentrations of metals (Ref. 9, pp. 20, 23, 24, and 27). These background concentrations have been used to determine the significance of metals detected at Source 4. If a metal was detected in both background samples, the sample with the higher concentration was used as the comparative sample. The analytical results for the sample collected at Source 4 are provided in the table below.

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
Anthracene	Soil-11	4,000	2,037	9, pp. 159 and 313
Benzo(a)anthracene	Soil-11	11,000 J	2,037	9, pp. 159 and 313
Benzo(b)fluoranthene	Soil-11	20,000 J+	10,185	9, pp. 159 and 315
Benzo(a)pyrene	Soil-11	8,800 J	2,037	9, pp. 159 and 313
Benzo(g,h,i)perylene	Soil-11	3,800 J	2,037	9, pp. 159 and 313
Bis(2-ethylhexyl)phthalate	Soil-11	72,000 +	10,185	9, pp. 159 and 315
Carbazole	Soil-11	2,600	2,037	9, pp. 159 and 313
Chrysene	Soil-11	8,500 J	2,037	9, pp. 159 and 313
Chlordane (alpha)	Soil-11	58J	10.4	9, pp. 167 and 362
Fluoranthene	Soil-11	20,000 +	10,185	9, pp. 159 and 315
Indeno(1,2,3-cd)-pyrene	Soil-11	4,200 J	2,037	9, pp. 159 and 313
Phenanthrene	Soil-11	14,000 +	2,037	9, pp. 159 and 315
Pyrene	Soil-11	13,000 J	2,037	9, pp. 159 and 313

SWOF - Observed Release
Direct Observation
Source 4

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (Soil-5 or Soil-6) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Arsenic	Soil-11	33.8 L	3.9 L	2.5	9, pp. 110, 113, 211, 231 and 232
Cadmium	Soil-11	6.3	ND	1.3	9, pp. 110, 113, 211, 231 and 232
Copper	Soil-11	467	25.8	6.3	9, pp. 110, 113, 211, 231 and 232
Lead	Soil-11	1,530	201 J	0.8	9, pp. 110, 113, 211, 231 and 232
Mercury	Soil-11	0.85	0.28	0.13	9, pp. 110, 113, 211, 231 and 232
Nickel	Soil-11	224	ND	10	9, pp. 110, 113, 211, 231 and 232
Silver	Soil-11	17.5	ND	2.5	9, pp. 110, 113, 211, 231 and 232
Zinc	Soil-11	1,520	77.0	5.0	9, pp. 110, 113, 211, 231 and 232

Notes:
- CRDL Contract-required detection limit
- CRQL Contract-required quantitation limit
- ND Not detected above the detection limit
- mg/kg Milligrams per kilogram
- µg/kg Micrograms per kilogram

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise
- L Analyte present; reported value may be biased low
- [ ] Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
- + Results taken from diluted sample

MDE Sample Results - 1994

MDE returned to Source 4 in 1994 to collect soil samples from 3 locations(Ref. 60, p. 2). The samples were analyzed in accordance with EPA CLP protocols for TCL organic and TAL inorganic parameters (Ref. 60, pp. 8 and 9; Ref. 61).

Hazardous Substance	Evidence	Concentration (µg/kg)	AQL (µg/kg)	Reference
1,2,4-Trimethylbenzene	S-5	475	179	61, pp. 17, 19 and 27
Naphthalene	S-5	281,000	165	61, pp. 17, 19 and 27
Benzo(b)fluoranthene	S-2	15,000	82.5	61, pp. 17, 19 and 27
Benzo(a)anthracene	S-5	90,000 J	165	61, pp. 17, 19 and 27
Benzo(a)pyrene	S-5	55,000 J	165	61, pp. 17, 19 and 27
Benzo(g,h,i)perylene	S-5	42,000	165	61, pp. 17, 19 and 27
Benzo(k)fluoranthene	S-5	95,000 J	165	61, pp. 17, 19 and 27
Bis(2-ethyhexyl)phthalate	S-5	45,000	165	61, pp. 17, 19 and 27
Buthylbenzylphthalate	S-2	22,000	82.5	61, pp. 17, 19 and 27
Carbazole	S-5	82,000 J	165	61, pp. 17, 19 and 27
Chrysene	S-2	8,200	82.5	61, pp. 17, 19 and 27
Dibenzofuran	S-5	76,000 J	165	61, pp. 17, 19 and 27
Fluoranthene	S-5	80,000 J	165	61, pp. 17, 19 and 27
Fluorene	S-5	70,000 J	165	61, pp. 17, 19 and 27
Indeno(1,2,3-cd)pyrene	S-5	55,000 J	165	61, pp. 17, 19 and 27
2-methylnaphthalene	S-5	132,000 J	165	61, pp. 17, 19 and 26
Aroclor-1260	S-2	564	82.5	61, pp. 17, 18 and 25

Notes:
AQL Actual quantitation limit
µg/kg Micrograms per kilogram
Analytical Data Qualifiers:
J Analyte present; reported value may not be accurate or precise

EPA SATA Team Sample Results - 2000

The EPA Region 3 SATA team collected samples from Source 4 as part of the ESI conducted in 2000. Sampling locations are shown in Figure 3 in Appendix A. The samples were analyzed for organic and inorganic parameters using CLP protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples collected for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 4 during the sampling event. To identify metal concentrations above background levels, the metal concentrations detected at Source 4 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12).

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Organics				
2-Methylnaphthalene	BLFWS-02B	630	559	7, p. 165; 79
Anthracene	BLF-SS02	1,200 J	1,919	7, p. 166; 79
Benzo(a)anthracene	BLF-SS02	4,400	1,919	7, p. 166; 79
Benzo(b)fluoranthene	BLF-SS02	6,000	1,919	7, p. 166; 79
Benzo(k)fluoranthene	BLF-SS02	3,200 J	1,919	7, p. 166; 79
Benzo(a)pyrene	BLF-SS02	5,000	1,919	7, p. 166; 79
Benzo(g,h,i)perylene	BLF-SS02	2,000	1,919	7, p. 166; 79
bis(2-Ethylhexyl)phthalate	BLFWS-02B	30,000	559	7, p. 166; 79
Chrysene	BLF-SS02	4,700	1,919	7, p. 166; 79
Fluoranthene	BLF-SS02	11,000	1,919	7, p. 166; 79
Indeno(1,2,3-cd)-pyrene	BLF-SS02	1,900	1,919	7, p. 166; 79
Phenanthrene	BLF-SS02	5,100	1,919	7, p. 166; 79
Pyrene	BLF-SS02	7,700	1,919	7, p. 166; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Barium	BLFWS-04B	802	118.0	56.5	7, pp. 12, 60, 87
Cadmium	BLFWS-03B	13.9	ND	1.3	7, pp. 12, 60, 87
Chromium	BLFWS-02B	77.2	27	2.7	7, pp. 12, 60, 87
Copper	BLFWS-01B	3,200 J	33.7	7.9	7, pp. 12, 60, 87
Lead	BLFWS-03B	2,710	101	0.78	7, pp. 12, 60, 87
Mercury	BLFWS-03A	0.64	0.18	0.1	7, pp. 12, 60, 87
Nickel	BLFWS-03B	91.6	16.3	10.4	7, pp. 12, 60, 87

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A) (mg/kg)	SQL (mg/kg)	Reference
Silver	BLFWS-01B	4.5 L	ND	3.2	7, pp. 12, 60, 87
Zinc	BLFWS-01B	2,290	142	6.3	7, pp. 12, 60, 87

Notes:

CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
ND	Not detected above the detection limit
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram

Analytical Data Qualifiers:

J	Analyte present; reported value may not be accurate or precise
L	Analyte present; reported value may be biased low
[ ]	Analyte present; as values approach the instrument detection limit the quantitation may not be accurate
+	Results reported from diluted sample

<u>**Chemical Analysis - Source 4**</u>

- MDE ESI Sample Results - Source 4

An observed release by chemical analysis from Source 4 into Redhouse Run can be documented based on chemical analysis of samples collected during the MDE ESI (Ref. 9, pp. 18, 20, and 47). All samples collected during the ESI were analyzed for TCL organic and TAL inorganic compounds in accordance with EPA CLP protocols (Ref. 9, p. 18). A sample collected from Redhouse Run upstream of the source was chosen as a background sample. The sample collected in Redhouse Run was chosen as a suitable background sample because it was collected within the same environmental setting, during the same sampling event and analyzed by the same CLP laboratory as the release sample The release sample, SED-6, was collected downstream of PPE_{4A}, at the point where Redhouse Run discharges into Herring Run (Ref. 9, pp. 19 and 47).

- Background Sample

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-4	Redhouse Run	Unknown	6/2/93 - 6/3/93	9, pp. 19, 153, 170, 171

- Background Concentrations

Sample ID	Hazardous Substance	Sample Concentration	SQL	Reference
Organics		**(µg/kg)**	**(µg/kg)**	
SED-4	Pyrene	ND	465	9, pp. 153, 277; 79
	bis(2-ethylhexyl)phthalate	ND	465	9, pp. 153, 277; 79
	alpha-Chlordane	6.6	2.4	9, pp. 165, 345; 79
	gamma-Chlordane	7.2	2.4	9, pp. 165, 345; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
SED-4	Copper	ND	22.3	9, pp. 112, 218; 79
	Lead	30.0	2.7	9, pp. 112, 218; 79
	Mercury	ND	0.5	9, pp. 112, 218; 79
	Nickel	ND	35.7	9, pp. 112, 218; 79
	Zinc	60.9	17.9	9, pp. 112, 218; 79

Notes:
- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- ND Not detected above the SQL
- SQL Sample quantitation limit; SQL calculations presented in reference 79

- Release Samples

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-6	Collected in Herring Run at confluence with Redhouse Run	Unknown	6/2/93	9, pp. 19, 20, 112, 170, 171; 77

- Release Concentrations

Sample ID	Hazardous Substance	Sample* Concentration	SQL	Reference
Organics		**(µg/kg)**	**(µg/kg)**	
SED-6	Pyrene	620	600	9, pp. 153, 281; 79
	bis(2-ethylhexyl)phthalate	1,800	600	9, pp. 153, 281; 79
	alpha-Chlordane	48	3.1	9, pp. 165, 347; 79
	gamma-Chlordane	50	3.1	9, pp. 165, 347; 79
Metals		**(mg/kg)**	**SQL (mg/kg)**	
SED-6	Copper	42.2	7.3	9, pp. 112, 220; 79
	Lead	121	0.9	9, pp. 112, 220; 79
	Mercury	0.28	0.15	9, pp. 112, 220; 79
	Nickel	22.6	11.7	9, pp. 112, 220; 79
	Zinc	230	5.9	9, pp. 112, 220; 79

Notes:
- * All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- SQL Sample quantitation limit; SQL calculations presented in reference 79

Analytical Data Qualifiers:
- J Analyte present; reported value may not be accurate or precise

- EPA SATA Team Sample Results - 2000

An observed release by chemical analysis can also be documented with samples collected during the 2000 ESI completed by the EPA Region 3 SATA team. Analytical results from a downstream sample collected during this sampling event in Redhouse Run (RHRSD-04), was compared to the analytical results for a sample collected in Redhouse Run upstream of Source 4 (RHRSD-01). The sample collected in Redhouse Run was chosen as a suitable background sample because it was collected within the same environmental setting, during the same sampling event and analyzed by the same CLP laboratory as the release sample (Ref. 7, p. 20; Ref. 82, Logbook 2, pp. 38 and 39). All sampling locations are shown in Figure 3 in Appendix A.

- Background Sample

Sample ID	Sample Location	Depth (inches)	Date	Reference
RHRSD-01	Redhouse Run	0-6	5/3/00	7, p. 20; 18; 82, Logbook 2, p. 39

- Background Concentrations

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
RHRSD-01	Pyrene	ND	407	7, p. 214; 79
	Chrysene	ND	407	7, p. 214; 79

Notes:
µg/kg Micrograms per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations presented in reference 79

- Release Sample

Sample ID	Sample Location	Depth (inches)	Date	Reference
RHRSD-04	Redhouse Run	0-6	5/3/00	7, p. 20; 18; 82, Logbook 2, p. 38

- Release Concentrations

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
RHRSD-04	Pyrene	800	402	7, p. 214; 79
	Chrysene	420	402	7, p. 214; 79

Notes:

µg/kg Micrograms per liter
SQL Sample quantitation limit; SQL calculations presented in reference 79

Attribution

As described in the source description section for Source 4, Robb Tyler disposed of wastes that contained hazardous substances at Source 4. Hazardous substances detected at Source 4 were also detected above background concentrations in a sediment sample collected in Redhouse Run downstream of Source 4. Redhouse Run is not located along the 15-mile TDL of any of the other four sources evaluated at the 68th Street Dump site. A sample collected of the incinerator ash located at Source 4 indicated elevated levels of arsenic, copper, lead, mercury, nickel, and zinc. These hazardous substances were also found to be elevated in the downstream release sample. No other potential sources of this contamination have been identified at this time.

Hazardous Substances in the Release

alpha-Chlordane
bis(2-ethylhexyl)phthalate
Chrysene
Copper
gamma-Chlordane
Lead
Mercury
Nickel
Pyrene
Zinc

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence values for Source 4.

Highest Toxicity/Persistence Value = 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
4	Redhouse Run Landfill	5.77*	No
	TOTAL	**5.77***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2) = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule Section 2.4.3.1 (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7 = 32

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at Source 4.

Toxicity/Persistence/Bioaccumulation Factor Value = $5x10^8$

4.1.3.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
4	Redhouse Run Landfill	5.77	No
	TOTAL	**5.77***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = $5x10^8$

Toxicity/Persistence Factor Value (10,000) × HWQ Value (100) = 1×10^6
$1\times10^6 \times$ BPFV ($5x10^8$) = Waste Characteristics Product ($5x10^{14}$) (subject to maximum value of 1×10^{12}

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Herring Run has been established as a fishery along the entire 15-mile TDL (see Section 4.1.3.3 of the documentation record).

Sediment Samples - Herring Run

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. Hazardous substances detected in sediment samples collected downstream of all five sources were also detected at each individual source; therefore the release of these hazardous substances is partially attributable to each of the sources identified at the 68th Street Dump site. In addition, SED-6 is also provided because it is located directly downstream of Source 4 at the confluence of Redhouse Run and Herring Run. The sample is documented in the observed release section of this Appendix, the remainder of the samples are documented in the observed release section of the documentation record for the entire site. The bioaccumulation potential factor values are documented in Section 4.1.3.2.1 of the documentation record of the entire site.

Sample ID	Downstream of Source No.	Hazardous Substance	Sample Concentration* (µg/kg)	Bioaccumulation Value
Organics				
SED-6	4	bis(2-ethylhexyl)phthalate	1,800	50,000
		alpha-Chlordane	48	500
		gamma-Chlordane	50	50,000
BR-SD03	1,2,3,4,5	Benzo(a)anthracene	650	50,000
		Benzo(k)fluoranthene	620	50,000
		Benzo(a)pyrene	680	50,000
Sample ID		**Hazardous Substance**	**Sample Concentration (mg/kg)**	**Bioaccumulation Value**
Metals				
SED-6	4	Copper	42.2	50,000
		Mercury	0.28	50,000
		Zinc	230	500
BR-SD04	1, 2, 3, 4, 5	Zinc	464 L	500
BR-SD06	1, 2, 3, 4, 5	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

Analysis of sediment samples SED-6, BR-SD04, and BR-SD06 detected a hazardous substance (zinc) that was separately documented in an observed release by chemical analysis for Source 4. Sediment samples, SED-6, BR-SD04, and BR-SD06, document that zinc has been released into the Herring Run fishery downstream of PPE_4.

Sample ID: BR-SD06
Distance from confluence: of Redhouse Run and Herring Run 581 feet
Reference: Figures 2, 3, and 6 in Appendix A

Level II Fisheries - 68th Street Dump site

A hazardous substance that has a bioaccumulation potential factor value of 500 or greater was detected in a sediment sample collected from Herring Run. The extent of Level II fisheries that can be documented for BR-SD-6 includes the distance from Redhouse Run and Herring Run to sediment sampling location BR-SD06.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	581 feet

4.1.3.3.1 <u>Food Chain Individual</u>

A food chain individual factor value of 45 is assigned for Source 4 because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances that can be partially attributed to migration from Source 4 (Ref. 1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 **Level II Concentrations**

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Sources 4 of the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is not scored and is assigned a contamination factor value of greater than zero.

Potential Human Food Chain Contamination Factor Value = >0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 <u>Ecosystem Toxicity/Persistence/Bioaccumulation</u>

See Section 4.1.4.2.1 of the HRS Documentation Record for the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for Source 4. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = $5x10^8$

4.1.4.2.2 **<u>Hazardous Waste Quantity</u>**

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
4	Redhouse Run Landfill	5.77	No
	TOTAL	**5.77***	

* Level II targets documented downstream of this source; therefore an HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculations are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = 1×10^6

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1 \times 10^6 \times 50{,}000 = 5 \times 10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present at this location that run contiguous to Herring Run (Ref. 81). Hazardous substances (benzo(a)pyrene, benzo(a)anthracene, and benzo(k)fluoranthene) were detected in this sample that were also detected at Source 4.

Sample ID:	BR-SD03
Distance from PPE_4:	3,014 feet
Reference:	Figures 2 and 3 in Appendix A

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

Wetlands

The PPE of hazardous substances from Source 4 is into the wetlands documented to have covered the entire area of Source 4 prior to landfilling. The total length of wetlands documented at Source 4 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of Source 4. This length is 0.40 mile; therefore the assigned HRS wetland rating for Source 4 is 25 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 Potential Contamination

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 75). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

Chesapeake Bay:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands occur along the Herring Run, Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\ D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$SP_{\mathit{Back\ River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$SP_{\mathit{Chesapeake\ Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$SP_{\mathit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065

APPENDIX G

SOURCE 5 SCORING

SOURCE 5 SCORESHEETS
INDUSTRIAL ENTERPRISES/UNCLAIMED LANDFILL

WORKSHEET FOR COMPUTING HRS SITE SCORE
68th STREET DUMP
SOURCE 5

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by four and take the square root		50.00

NS = Not scored

TABLE 4-1

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
68th STREET DUMP
SOURCE 5

Factor Categories and Factors		Maximum Value	Value Assigned
Drinking Water Threat			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	---
	2b. Runoff	25	---
	2c. Distance to Surface Water	25	---
	2d. Potential to Release by Overland Flow [lines 2a x (2b +2c)]	500	---
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	---
	3b. Flood Frequency	50	---
	3c. Potential to Release by Flood [lines 3a x 3b]	500	---
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	500	---
5.	Likelihood of Release [higher of lines 1 and 4]	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	10,000
7.	Hazardous Waste Quantity	a	100
8.	Waste Characteristics	100	32
	Targets		
9.	Nearest Intake	50	0
10.	Population		
	10a. Level I Concentrations	b	0
	10b. Level II Concentrations	b	0
	10c. Potential Contamination	b	0
	10d. Population [lines 10a + 10b + 10c]	b	0
11.	Resources	5	0
12.	Targets [lines 9 + 10d + 11]	b	0
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	0

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT
SCORESHEET (Continued)
68th STREET DUMP
SOURCE 5

Factor Categories and Factors Assigned	Maximum Value	Value Assigned
Human Food Chain Threat		
Likelihood of Release		
14. Likelihood of Release [same value as line 5]	550	550
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	a	5×10^8
16. Hazardous Waste Quantity	a	100
17. Waste Characteristics	1,000	1,000
Targets		
18. Food Chain Individual	50	45
19. Population		
19a. Level I Concentrations	b	0
19b. Level II Concentrations	b	0.03
19c. Potential Human Food Chain Contamination	b	–
19d. Population [lines 19a + 19b + 19c]	b	0.03
20. Targets [lines 18 + 19d]	b	45.03
Human Food Chain Threat Score		
21. Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (Continued)
68TH STREET DUMP
SOURCE 5

Factor Categories and Factors Assigned		**Maximum Value**	**Value Assigned**
Environmental Threat			
	Likelihood of Release		
22.	Likelihood of Release [same value as line 5]	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	50
	26c. Potential Contamination	b	0.0065
	26d. Sensitive Environments [lines 26a + 26b + 26c]	b	
27.	Targets [value from line 26d]	b	50.01
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60	53.33
	Surface Water Overland/Flood Migration Component Score for a Watershed		
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	100	100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.0 SURFACE-WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 DEFINITION OF THE HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT - SOURCE 5

Prior to landfilling the entire area of Source 5 was covered in E2EM wetlands located adjacent to Herring Run; therefore the PPE of hazardous substances from Source 5 into surface waters is in these wetlands (Ref. 81, p. 15 and Figure 3). Two unnamed tributaries to Herring Run flow through Source 5. One of the tributaries originates in the western section of Source 5, flows to the south and eventually flows in an north-eastwardly direction prior to discharging into Herring Run. A second intermittent tributary flows through the southern portion of Source 5, eventually joining the first tributary (Ref. 20; Ref. 41; Ref. 42; Ref. 43). The in-water segment of the surface water pathway TDL was measured from three different starting points: 1) the point determined to be where the wetlands would discharge into the unnamed tributary located on Source 5 (PPE_{5A}); 2) the most upstream point in Herring Run where the Source 5 wetlands would discharge (PPE_{5B}); and 3) the most downstream point in Herring Run where the Source 5 wetlands would discharge (PPE_{5C}). From $PPE_{5A,}$ the unnamed tributary flows for approximately 2,640 feet until it discharges into Herring Run. From this point, Herring Run flows for approximately 1.2 mile until it enters the Back River. From the PPE farthest upstream in Herring Run (PPE_{5B}), Herring Run flows in a easterly direction for approximately 0.67 mile until it becomes the Back River. The remainder of the 15-mile TDL is outlined in the last paragraph of this section.

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release - Source 5

Direct Observation

-Basis for Direct Observation - Source 5

Historical aerial photographs document that prior to use as a dump E2EM wetlands covered the entire area of Source 5 (Ref. 81, Figure 3). MD DHMH inspection reports first document Robb Tyler's dumping into these wetlands in 1956 (Ref. 8, pp. 44 and 46; Ref. 40). These inspection reports further document that the refuse disposed of at Source 5 consisted mostly of industrial waste (Ref. 39). An inspection conducted in June 1956 described the dumping of wastes at this time as occurring "at a place where high ground slopes steeply down to a tidal marsh" (Ref. 8, p. 44). On the slope a large pit was observed where waste oil was being dumped. The pit was located "down near the water" and contained oil at the time of the inspection (Ref. 8, p. 44). Wastes were being dumped out into the marsh to dike Herring Run and allow for more dumping to occur in the area formerly occupied by wetlands (Ref. 8, p. 44). Also, the fill material reportedly contacted the water along much of the original shoreline. The inspector noted that "in places the fill has imparted a black deoxygenated look to the water" (Ref. 8, p. 2; Ref. 44, pp. 14 through 29). One such place was near the oil pit (Ref. 8, p. 44). An inspection conducted in December of 1956 further describes the oil pit located on Source 5. According to the foreman at the site, this pit was constructed for the deposition of oil sludge from the Standard Oil Company Refinery. Seepage out of the oil pit and into the surrounding marsh was observed at this time along with an oil slick on the water adjacent to the pit. A second pit was also noted during this inspection that contained oil and drained into the marsh from one end (Ref. 40). A photograph was taken on Source 5 that documents the "dumping of waste oil" into a pit. Wetland vegetation is clearly visible surrounding this pit (Ref. 91).

A deposition from a truck driver that hauled waste for Robb Tyler from the 1950s to 1979 provides documentation of the existence of pits located at Source 5 for the disposal of sludges and paint wastes. Waste disposed of into these pits was generated from General Motors, Signode Steel, O'Brien Paint, and Thompson's Wire. According to his deposition, there were two pits located at Source 5. The deponent testified that the size of the pits to be "two or three hundred yards around it" (Ref. 83, pp. 5, 9, 10, 15, 17, 18, 19, 21, 28, 29, 48, 64, 65, 66, 69). Testimony from another driver also provides evidence that General Motors wastes were deposited directly into wetlands. This driver stated that on a weekly basis, for a period of ten years, drummed paint waste generated by General Motors was poured onto the ground in the wetlands area of the site (Ref. 10, p. 4).

Further documentation of disposal of hazardous wastes into the wetlands of Source 5 is documented by a 1979 inspection completed by the Maryland Department of Natural Resources, Water Resources Administration. This inspection uncovered drums containing a gray-green solid dumped into a ravine located in wetlands (Ref. 41; Ref. 43; Ref. 45; Ref. 52, pp. 5, 6, 108). The review of historical aerial photographs taken during this time period also document that the area where these drums and associated wastes were disposed of was wetlands (Ref. 12, pp. 23, 24, and 25). A reinspection of the area where these drums were dumped in 1980 revealed leachate in the stream bed located at the edge of this drum disposal area (Ref. 42).

The MD WMA conducted a reconnaissance of Source 5 on March 5, 1985. A drum disposal area different from the one encountered in 1979 was discovered at this time. The MD WMA observed an approximately 5 to 7 acre area located in the western portion of Source 5 that contained hundreds of drums (Ref. 15, pp. 3 through 5). Also observed during this reconnaissance was the oil seep into the unnamed tributary first observed in 1984. The seep was observed to still be leaching oil into the stream from an embankment adjacent to the stream (Ref. 15, p. 3; Ref. 48). In the eastern portion of Source 5, abandoned cars and trucks and hundreds of tires were observed. A recently excavated pit, measuring 120 feet by 50 feet, filled with tires was also observed in this area (Ref. 15, p. 4; Ref. 54, p. 5).

On June 28, 1984, an inspector from the Maryland Department of Natural Resources, Water Resources Administration observed an oil seep, subsequently determined to be a fuel oil, emerging from the bank of the unnamed tributary that flows through Source 5. In MDE file information, the location of this seep was depicted on Baltimore County Tax Map parcel 16 (Ref. 47 and Ref. 53).

Aerial photographs first document the deposition of wastes into the wetlands located on Source 5 in 1957 (Ref. 6; Ref. 81). The aerial photograph taken in 1957 shows a lagoon (noted as LG-1) located on Source 5 that contained dark-toned standing liquid (Ref. 12, pp. 16 and 17). Solid waste disposal is evident on aerial photographs taken of Source 5 continuing through 1973 (Ref. 12; Ref. 81).

- Hazardous Substances in the Release - Source 5

Information gathered during EPA investigations provides documentation of hazardous waste deposition at the 68th Street Dump by Robb Tyler. From the early 1950s through the 1970s, wastes from various industries located in the Baltimore area were disposed of at the five sources that comprise the 68th Street Dump. Written testimonies from haulers and former employees of Robb Tyler indicate that all types of wastes was accepted at the site (Ref. 10, pp. 4, 14, 17, 24, 38, 49, 50, 105, 155, 156 and 157). According to Robb Tyler, prior to the 1960s, there were no restrictions on the types of wastes that could be dumped at the landfill. Mr. Tyler further testified that drummed liquid wastes were disposed of at the 68th Street Dump site and stated that if "they could resell the drums brought in they would do so" (Ref. 84, p. 75). A former employee also testified that wastes in drums were dumped out so that Robb Tyler could sell the drums (Ref. 83, p. 23). These statements indicate that the wastes contained in the drums were disposed of directly into the wetlands that predominately covered all five source areas located at the site during the 1950s and 1960s (Ref. 81, Figures 4 and 5). Information is available for some of the generators of wastes disposed of at the site. The generators, wastes streams, and hazardous substances documented in these waste streams have been summarized in Table 1 in Appendix B. Wastes from most of these generators may have been disposed of at all five of the sources that comprise the site. Interviews of former waste haulers indicate that wastes were dumped at various areas of the site. Drivers were told where to dump their waste by the scale house operator or bulldoze operator after arrival at the dump (Ref. 10, pp.13, 14, 23, 24, 32, 44, 66, 113, 121, 124, 134 and 154). EPA's aerial photography analysis of wetland loss completed for the site supports the conclusion that from the late 1950s through 1968, dumping of wastes was occurring into the wetlands of all five sources (Ref. 81, p. 15 and Figures 3 through 7).

In some cases, available information is sufficient to document that a particular waste stream was disposed of at a specific source. Evidence indicates that waste streams generated by the following industries were disposed of at Source 5: Baltimore Gas and Electric; Allied Chemical; Western Electric; Noxell Corporation; GAF Materials; Armco; Koppers; the O'Brien Company; General Motors; Crown, Cork, & Seal; Bruning Paint Company; SCM (Glidden Durkee, Co.); Exxon (Standard Oil); Signode Steel; and the Baltimore Sun. Hazardous substances associated with the waste streams generated by these industries include trivalent chromium, potassium bichromate, copper, kepone, arsenic, chromium, fluoboric acid, cyanide acid, trichloroethene, sodium hydroxide, acetone, waste enamel, PAHs, PCBs, iron oxides, manganese, silicone, tin, mercury, paint waste, antimony, barium, cadmium, iron, nickel, zinc, hexavalent chromium, selenium, silver, ammonia nitrate, phenol, diethanolamine, xylol, ketone, isophorone, methyl ethyl ketone, nitric acid, chromic acid, methyl isobutyl ketone, sulphuric acid, chromate pigments, phosphoric acid, barium, cryolite-asbestos, potassium nitrate, lead oxide, sodium nitrate, solvents, ink, and 1,1,1-trichloroethane (see Table 1 in Appendix B for references).

In addition, a deposition from a truck driver that hauled waste for Robb Tyler from the 1950s to 1979 provides documentation of the existence of pits located at Source 5 for the disposal of sludges and paint wastes. According to this deposition, wastes generated from General Motors, Signode Steel, O'Brien Paint, and Thompson's Wire were disposed of into two pits located at Source 5. The deponent testified the size of the pits to be "two or three hundred yard around it" (Ref. 83, pp. 5, 9, 10, 15, 17, 18, 19, 21, 28, 29, 48, 64, 65, 66, 69).

Documentation that wastes containing hazardous substances were disposed of at Source 5 is also provided by laboratory analytical results. As detailed in the paragraphs below, samples were collected from drums and seeps encountered on Source 5, a pond located on Source 5, test pits excavated at the source, and from wetlands that remain at Source 5.

Laboratory analytical results are available from samples collected of the 55-gallon drums of waste dumped into a ravine located within the wetlands of Source 5. These drums contained large amounts of zinc (48.6%) (Ref. 41; Ref. 43). Analysis of a sample of the waste material revealed a zinc concentration of 486,000 ppm (Ref. 41). In addition, laboratory analysis of the contents of the drums determined the waste to be classified as hazardous because the concentrations of lead and cadmium exceeded EP Toxicity levels (Ref. 44). The unnamed tributary to Herring Run flows from north to south through this area (Ref. 20). A sample of this stream near this disposal area revealed a zinc concentration of 500 ppm in the stream (Ref. 41). Additional evidence of the hazardous substances released into the surrounding environment from this area of Source 5 is obtained from analytical results from monitoring wells. In 1981, four monitoring wells were installed by the MD Department of Health and Mental Hygiene. Ground water elevation readings indicated that ground water was flowing in a northeast direction, towards Herring Run. Analytical results from ground water samples collected from an upgradient background well revealed an average zinc concentration of 0.84 milligrams per liter (mg/L); an average cadmium concentration of 0.01 mg/L; and an average lead concentration of 0.31 mg/L. Results from ground water samples collected from a monitoring well installed in the drum disposal area indicated a zinc concentration of 1,015.0 mg/L; a cadmium concentration of 0.56 mg/L; and a lead concentration of 3.8 mg/L. The zone of ground water contamination from this area was determined to extend at least 100 feet downgradient towards Herring Run (Ref. 44).

On March 13, 1985 MD WMA collected a sample of the oil-like substance that was observed entering the unnamed tributary to Herring Run. The sample was analyzed for PCBs by the State of Maryland's Hazardous Waste Laboratory. Analytical results indicated a PCB concentration of 90,000 µg/kg. A second sample of the substance entering the stream was collected on April 16, 1985; the PCB concentration in this sample was 84,000 µg/kg. A third sample was collected from the soils in the embankment where the oil seep appeared to be originating from; this soil sample had a PCB concentration of 5,500 µg/kg (Ref. 15, pp. 3, 24, and 99; Ref. 47; Ref. 48; Ref. 53).

In 1989, MD WMA collected a sediment sample from the pit filled with tires that is located at Source 5 (Ref. 15, p. 4; Ref. 54, p. 5; Ref. 52, Vol. I, p. 111). Analytical results from this sample are shown in the table below.

Hazardous Substance	Evidence	Concentration (µg/kg)	SQL (µg/kg)	Reference
Phenanthrene	SED-4	1,100	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Fluoranthene	SED-4	950	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Pyrene	SED-4	1,100	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Benzo(a)anthracene	SED-4	1,200	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Chrysene	SED-4	1,400	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Benzo(a)pyrene	SED-4	970	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Benzo(k)fluoranthene	SED-4	2,800	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Indeno(1,2,3-cd)pyrene	SED-4	810	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Benzo(g,h,i)perylene	SED-4	790	660	52, Vol. I, pp. 66 and 111; Vol. II, p. 146; 79
Aroclor-1254	SED-4	5,100	3,200	52, Vol. I, pp. 66 and 111; Vol. II, p. 147; 79

Notes:
µg/kg Micrograms per kilogram
SQL Sample quantitation limit; SQL calculations provided in reference 79

Finally, analytical results from samples collected as part of the ESI conducted in 2000 by the EPA SATA team provides further documentation of the hazardous substances disposed of into the E2EM wetlands of Source 5. These samples were collected at Source 5 in locations documented by historical aerial photographs to have at one time been covered with wetland vegetation. These aerial photographs further document the disposal of wastes into these wetlands (Ref. 12, pp. 14 through 29; Ref. 81). No removal of waste has occurred from this source; therefore, the analytical results summarized in the table below document the hazardous substances present in the waste that was directly deposited into the wetlands of Source 5. Sampling locations are provided in Figure 3 in Appendix A. These samples were analyzed for organic and inorganic parameters using CLP laboratory protocols. The samples collected for organic analysis were analyzed for SVOCs, PCBs and pesticides. The samples analyzed for inorganic analysis were analyzed for total metals. The table below summarizes the hazardous substances detected at Source 5 during this sampling event. To identify metal concentrations exceeding background levels, the metal concentrations detected at Source 5 were compared to the concentrations detected in soil sample CPBWSS-01A, which was collected outside the influence of the site (Ref. 7, p. 12). Only the analytical result for the sample with the highest concentration of each hazardous substance is provided in the table below, (for a complete list of all contaminated samples collected from Source 2, see Section 2.2, Source Characterization).

EPA SATA Team Sample Results - 2000

Hazardous Substance	Evidence	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics				
Acenaphthene	UCLF-WS04B	10,000	2,426	7, p. 139; 79
Anthracene	UCLF-WS04B	11,000	2,426	7, p. 140; 79
Benzo(a)anthracene	UCLF-WS04B	18,000	2,426	7, p. 140; 79
Benzo(b)fluoranthene	UCLF-WS04B	11,000 +	2,426	7, p. 140; 79
Benzo(k)fluoranthene	UCLF-WS04B	6,800	2,426	7, p. 140; 79
Benzo(a)pyrene	UCLF-WS04B	17,000	2,426	7, p. 140; 79
Benzo(g,h,i)perylene	UCLF-WS04B	7,000	2,426	7, p. 140; 79
bis(2-Ethylhexyl)phthalate	UCLF-WS11B	440,000 +	67,808	7, p. 144; 79
Butylbenzylphthalate	UCLF-WS13B	77,000	15,277.8	7, p. 144; 79
Carbazole	UCLF-WS04B	2,700	2,426	7, p. 140; 79
4-Chlorophenyl-phenyl Ether	UCLF-WS04B	12,000	2,426	7, p. 140; 79
Chrysene	UCLF-WS04B	19,000	2,426	7, p. 140; 79
Dibenzofuran	UCLF-WS04B	9,700	2,426	7, p. 140; 79
Dibenz(a,h)anthracene	UCLF-WS04B	3,700	2,426	7, p. 140; 79
Di-n-butylphthalate	UCLF-WS10B	6,400 J (640)	6,470.6	7, p. 144; 79
Fluoranthene	UCLF-WS04B	38,000 +	12,132	7, p. 140; 79
Indeno(1,2,3-cd)-pyrene	UCLF-WS04B	7,500	2,426	7, p. 140; 79
2-Methylnaphthalene	UCLF-WS04B	4,100	2,426	7, p. 139; 79
Naphthalene	UCLF-WS09B	350,000	733	7, p. 141; 79
n-Nitroso-di-n-propylamine	UCLF-WS04B	25,000 +	12,132	7, p. 139; 79
Phenanthrene	UCLF-WS04B	50,000 +	971	7, p. 140; 79
Phenol	UCLF-WS02B	3,800	2,845	7, p. 139; 79
Pyrene	UCLF-WS04B	30,000 +	12,132	7, p. 140; 79
Aroclor-1242	UCLF-WS02B	1,600 J (160)	56.9	7, p. 145; 79
Aroclor-1254	UCLF-WS06C	1,400 J (140)	49.3	7, p. 146; 79

Hazardous Substance	Evidence	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Aroclor-1260	UCLF-WS06B	6,500 +	846	7, p. 146; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (CPBWSS-01A)* (mg/kg)	SQL (mg/kg)	Reference
Metals					
Antimony	UCLF-WS14B	37.2	ND	25.3	7, pp. 12, 52, 87; 79
Arsenic	IELF-WS03C	51.6	4.3 L (7.48)	2.8	7, pp. 12, 55, 87; 79
Barium	UCLF-WS11B	3,290 +	118.0	54.1	7, pp. 12, 52, 87; 79
Beryllium	UCLF-WS06B	1.8	[0.76]	1.4	7, pp. 12, 51, 87; 79
Cadmium	UCLF-WS11B	9.6	ND	1.4	7, pp. 12, 52, 87; 79
Chromium	UCLF-WS06B	1,660	27	2.8	7, pp. 12, 51, 87; 79
Copper	UCLF-WS08B	5,240 J (4,295)	33.7	7.0	7, pp. 12, 51, 87; 79
Lead	UCLF-WS11B	4,720 J (3,277.8)	101	0.8	7, pp. 12, 52, 87; 79
Manganese	UCLF-WS05A	13,300 +	487	33.9	7, pp. 12, 50, 87; 79
Mercury	UCLF-WS09B	6.5	0.18	0.2	7, pp. 12, 51, 87; 79
Nickel	UCLF-WS08B	446	16.3	19.6	7, pp. 12, 51, 87; 79
Silver	UCLF-WS12B	10.8	ND	2.6	7, pp. 12, 52, 87; 79
Zinc	IELF-WS13B	5,200 K (3,467)	142	7.1	7, pp. 12, 52, 87; 79

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected above the SQL
SQL Sample quantitation limit; SQL calculations presented in reference 79

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise
K Analyte present; reported value may be biased high
L Analyte present; reported value may be biased low
\+ Results reported from diluted sample

Although a large amount of the wetlands documented to have at one time existed at Source 5 have subsequently been filled in, wetland areas do remain. Documentation that hazardous waste was deposited directly into wetlands at Source 5 is documented by the laboratory analysis of samples collected from the wetlands that remain at Source 5. The table below summarizes the hazardous substances detected in wetlands located at Source 5. To identify metal concentrations exceeding background levels, the metal concentrations detected in these wetland samples were compared to the analytical results from a sediment sample collected from a wetland located outside the influence of the site. This sample was collected in a wetland area located along Herring Run, upstream of the 68th Street Dump site. The sample was collected by the EPA Region 3 START in February 2001 and was analyzed for the same parameters as the samples collected from Source 1 (TCL organics and TAL metals by an EPA CLP laboratory) (Ref. 65). All sampling locations are shown on Figure 3 in Appendix A.

<u>EPA SATA Team Wetland Sample Results - 2000</u>

Hazardous Substance	Evidence	Concentration* (µg/kg)	SQL (µg/kg)	Reference
Organics				
Fluoranthene	BRWT-SD06	1,700 J (170)	589.5	7, p. 221; 79
Phenanthrene	BRWT-SD06	800 J (80)	589.3	7, p. 223; 79
Pyrene	BRWT-SD06	1,400 J (140)	589.5	7, p. 221; 79
Benzo(a)anthracene	BRWT-SD06	780 J (78)	589.3	7, p. 221; 79
Chrysene	BRWT-SD06	1,100 J (110)	598.9	7, p. 221; 79
bis(2-Ethylhexyl)phthalate	BRWT-SD06	1,300 J (130)	589.3	7, p. 221; 79
Benzo(b)fluoranthene	BRWT-SD06	1,200 J (120)	598.9	7, p. 221; 79
Benzo(k)fluoranthene	BRWT-SD06	740 J (74)	589.3	7, p. 221; 79
Benzo(a)pyrene	BRWT-SD06	920 J (92)	589.3	7, p. 221; 79
alpha-Chlordane	BRWT-SD06	9.2 J (.92)	3.03	7, p. 225; 79
gamma-Chlordane	BRWT-SD06	8.4 J (.84)	3.03	7, p. 225; 79
	IELFWT-SD02	5.4	4.2	7, p. 224; 79

Hazardous Substance	Evidence	Concentration (mg/kg)	Background Concentration (SED-01) (mg/kg)	SQL (mg/kg)	Reference
Metals					
Chromium	IELFWT-SD02	76.5	21.6	5.29	7, p. 83; 65, p. 5; 79
Lead	IELFWT-SD02	204	49.8	1.59	7, p. 83; 65, p. 5; 79
	BRWT-SD06	154	49.8	1.2	7, p. 84; 65, p. 5; 79
Mercury	IELFWT-SD02	0.97 B	[0.12] K	0.26	7, p. 83; 65, p. 5; 79
Nickel	IELFWT-SD02	77.5	15.8	21.2	7, p. 83; 65, p. 5; 79
Zinc	IELFWT-SD02	726	75.1	10.6	7, p. 83; 65, p. 5; 79

Notes:

- * All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.
- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- ND Not detected above the SQL
- SQL Sample quantitation limit; SQL calculations provided in reference 79

Analytical Data Qualifiers:

- J Analyte present; reported value may not be accurate or precise
- K Analyte present; reported value may be biased high

Chemical Analysis - Source 5

An observed release by chemical analysis can be documented by the analytical results for sediment samples collected by MDE from the unnamed tributary that flows through Source 5. The unnamed tributary originates on Source 5 therefore a sample collected from Redhouse Run during the MDE ESI is provided as a background sample. This sample was chosen to document background concentrations because it was collected by the same agency (MDE) using the same sampling protocols as the release samples; it was analyzed, like the release samples, using CLP protocols; and Redhouse Run is a similar size and flow as the unnamed tributary (Ref. 20; Ref. 9, p. 18; Ref. 52, p. 2).

- Background Sample - Sediment

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-4	Redhouse Run	Unknown	6/2/93 - 6/3/93	9, pp. 19, 153, 171

- Background Concentration - Sediment

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
SED-4	Aroclor-1254	ND	46.5	9, pp.165, 345; 79
	Phenanthrene	ND	181.5	9, pp.153, 277; 79
	Benzo(k)fluoranthene	ND	181.5	9, pp.153, 277; 79
	Fluoranthene	ND	181.5	9, pp.153, 277; 79
	Pyrene	ND	181.5	9, pp.153, 277; 79

Notes:

µg/kg Micrograms per kilogram
ND Not detected above the contract-required detection limit
SQL Sample quantitation limit; calculation provided in reference 79

- Release Samples - Sediments

Sample ID	Sample Location	Depth (inches)	Date	Reference
SED-1	Tributary to Herring Run	Unknown	1/17/89 - 1/20/90	52, Vol. I, pp. 2, 13, 66, and 108
SED-2	Tributary to Herring Run	Unknown	1/17/89 - 1/20/90	52, Vol. I, pp. 2, 13, 66, and 108
SED-3	Tributary to Herring Run	Unknown	1/17/89 - 1/20/90	52, Vol. I, pp. 2, 13, 66, and 108

- Release Concentrations - Sediments

Sample ID	Hazardous Substance	Sample Concentration (µg/kg)	SQL (µg/kg)	Reference
SED-1	Aroclor-1254	1,400	571	52, Vol. I, p.66, Vol. II, p. 135; 79
SED-2	Aroclor-1254	470	320	52, Vol. I, p.66, Vol. II, p. 139; 79
SED-3	Phenanthrene	550	485	52, Vol. I, p.66, Vol. II, p. 142; 79
	Fluoranthene	820	485	52, Vol. I, p.66, Vol. II, p. 142; 79
	Pyrene	540	485	52, Vol. I, p.66, Vol. II, p. 142; 79
	Benzo(k)fluoranthene	580	485	52, Vol. I, p.66, Vol. II, p. 142; 79

Notes:
µg/kg Micrograms per kilogram
SQL Sample quantitation limit; calculation provided in reference 79

Attribution - Source 5

Available reports and aerial photographs document that Robb Tyler disposed of waste at Source 5 from the 1950s through early 1970 (Ref. 8, pp. 44 and 46; Ref. 12; Ref. 15, p. 6; Ref. 39; Ref. 40; Ref. 81). Prior to being landfilled, the majority of Source 5 was covered with E2EM wetlands (Ref. 81). As documented in the observed release section, wastes containing hazardous substances were disposed of at Source 5. The dump was uncontained, therefore hazardous substances in the waste material were able to migrate from the wetlands into the unnamed tributary and Herring Run. Documentation that this occurred is provided by the analytical results of samples collected from wetlands that remain at the source. In addition, laboratory analytical results from samples collected from drums, oil release seeps, and soils located at Source 5 document the presence of the same hazardous substances that were detected in the unnamed tributary and downstream release samples collected from Herring Run.

Hazardous Substances in the Release

Aroclor-1254
Benzo(k)fluoranthene
Fluoranthene
Phenanthrene
Pyrene

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence table.

~~**Highest Toxicity/Persistence Value = 10,000**~~

4.1.2.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**77.6***	

Level II targets documented downstream of this source; therefore a HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2) = 100

4.1.2.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the drinking water threat is calculated below, as specified in the HRS Final Rule Section 2.4.3.1 (Ref. 1):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Toxicity/Persistence Factor Value (10,000) × HWQ Factor Value (100) = 1×10^6

~~**Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 32**~~

4.1.2.3 DRINKING WATER TARGETS

There are no drinking water intakes located within the 15-mile TDL; therefore, the drinking water threat was not scored (Ref. 67).

4.1.3.2 Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

See Section 4.1.2.2 of the HRS Documentation Record for the toxicity/persistence factor values, the human food chain bioaccumulation values, and the combined toxicity/persistence/bioaccumulation factor values for all hazardous substances detected at the five sources that comprise the 68th Street Dump site.

Toxicity/Persistence/Bioaccumulation Factor Value = $5x10^8$

4.1.3.2.2 **Hazardous Waste Quantity**

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**77.6***	

* Level II targets documented downstream of this source; therefore a HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

SWOF/Food Chain-Waste Characteristics Factor Category Value

4.1.3.2.3 Waste Characteristics Factor Category Value

The waste characteristics factor value for the human food chain threat is calculated below, as specified in the HRS Final Rule (Ref. 1, Section 4.1.3.2.3):

Toxicity/Persistence Factor Value = 10,000
HWQ Factor Value = 100
Bioaccumulation Potential Factor Value (BPFV) = $5x10^8$

Toxicity/Persistance Factor Value (10,000) × HWQ Value (100) = $1x10^6$
$1x10^6$ × BPFV ($5x10^8$) = Waste Characteristics Product ($5x10^{14}$) (subject to maximum value of $1x10^{12}$)

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7) = 1,000

Waste Characteristics Factor Category Value = 1,000

4.1.3.3 HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Sediment Samples - Herring Run

Sediment samples collected from Herring Run that contained hazardous substances having a bioaccumulation potential factor value of 500 or greater and that meet the criteria for an observed release are presented below. Hazardous substances detected in sediment samples collected downstream of all five sources were also detected at each individual source; therefore the release of these hazardous substances is partially attributable to each of the sources identified at the 68th Street Dump site. All of these samples are documented in the observed release section, Section 4.1.2.1.1 for the overall site. The bioaccumulation potential factor values are documented in Section 4.1.3.2.1 of the documentation record of the entire site.

Sample ID	Downstream of Source No.	Hazardous Substance	Sample Concentration* (µg/kg)	Bioaccumulation Value
Organics				
BR-SD03	1,2,3,4,5	Benzo(a)anthracene	650	50,000
		Benzo(k)fluoranthene	620	50,000
		Benzo(a)pyrene	680	50,000
Sample ID		**Hazardous Substance**	**Sample Concentration (mg/kg)**	**Bioaccumulation Value**
Metals				
BR-SD04	1, 2, 3, 4, 5	Zinc	464 L	500
BR-SD06	1, 2, 3, 4, 5	Zinc	327	500

Notes:

* All qualified data has been adjusted in accordance with EPA's fact sheet entitled "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 19). Where an adjustment is required, the adjusted value is shown in parenthesis.

mg/kg Milligrams per kilogram

µg/kg Micrograms per kilogram

Analytical Data Qualifiers:

J Analyte present; reported value may not be accurate or precise

L Analyte present; reported value may be biased low

Closed Fisheries

No closed fisheries have been established within the 15-mile TDL.

Level I Concentrations

No Level I concentrations have been established.

Most Distant Level II Sample

Analysis of sediment sample BR-SD03 detected three hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene) in Herring Run that were also detected in samples collected from Source 5.

Sample ID: BR-SD03
Distance from PPE_{5B}: 2,798 feet
Reference: Figures 2, 3, and 6 in Appendix A

Level II Fisheries

Hazardous substances that have bioaccumulation potential factor values of 500 or greater were detected in sediment samples collected from Herring Run. The extent of Level II fisheries that can be documented for Source 5 includes the distance from PPE_{5C} to sediment sampling location BR-SD03.

Identity of Fishery	Extent of the Level II Fishery
Herring Run	2,798 feet

4.1.3.3.1 Food Chain Individual

A food chain individual factor value of 45 is assigned for Source 5 because a portion of the Herring Run fishery is subject to Level II concentrations of hazardous substances that can be partially attributed to migration from Source 5 (Ref. 1).

Food Chain Individual Factor Value = 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I concentrations can be documented with the available data.

Level I Concentrations Factor Value = 0

4.1.3.3.2.2 Level II Concentrations

Herring Run is a fishery that has been documented to be subject to Level II concentrations of hazardous substances partially attributable to Source 5 of the 68th Street Dump site. The actual production value for Herring Run is unknown; therefore, the minimum production value is assigned for the area of actual contamination. The human food chain population value is based on HRS Final Rule Table 4-18 (Ref. 1).

Identity of Fishery	Annual Production (lbs)	References	Human Food Chain Population Value
Herring Run	> 0 to 100	9, p. 6; 16; 18; 68; 69; 70; 71; 72; and 76	0.03

Level II Concentrations Factor Value = 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Back River and Chesapeake Bay are both designated fisheries located within the 15-mile downstream TDL (Ref. 16; Ref. 69; Ref. 70; Ref. 73). Production values for the Back River and the portion of the Chesapeake Bay within the 15-mile surface water TDL are not known, therefore, the potential for human food chain contamination is not scored and is assigned a contamination factor value of greater than 0.

Potential Human Food Chain Contamination Factor Value = >0

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

See Section 4.1.4.2.1 of the HRS Documentation Record for the ecosystem toxicity/persistence factor values, the environmental bioaccumulation values and the ecosystem toxicity/persistence/bioaccumulation factor values for Source 5. The factor values were assigned from HRS Final Rule Tables 4-20 and 4-21 (Ref. 1).

Ecosystem Toxicity/Persistence/Bioaccumulation
Potential Factor Value = 5×10^8

4.1.4.2.2 Hazardous Waste Quantity

Source HWQ values assigned are summarized below.

Source No.	Source Name	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
5	Industrial Enterprises/Unclaimed Landfill	77.6	No
	TOTAL	**77.6***	

* Level II targets documented downstream of this source; therefore a HWQ factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The factor value for the environmental threat is calculated as specified in the HRS Final Rule (Ref. 1). The calculations are presented below.

Ecosystem Toxicity/Persistence Value = 10,000
Ecosystem Bioaccumulation Potential Factor Value = 50,000
HWQ Factor Value = 100
Ecosystem Toxicity/Persistence x HWQ = 1×10^6

(Ecosystem Toxicity/Persistence x HWQ) x
(Ecosystem Bioaccumulation Potential Factor Value) = $1 \times 10^6 \times 50{,}000 = 5 \times 10^{10}$

Waste Characteristics Factor Category Value = 320

4.1.4.3 Environmental Threat-Targets

- Level I Concentrations

No Level I concentrations of sensitive environments have been documented within the 15-mile downstream TDL.

Most Distant Level II Sample

Sediment sample BR-SD03 was collected in Herring Run. Wetlands are present at this location here that run contiguous to Herring Run (Ref. 81). Hazardous substances (benzo(a)anthracene, benzo(k)fluoranthene and benzo(a)pyrene) were detected in this sample that were also detected in samples collected from the five sources identified at the 68th Street Dump site.

Sample ID:	BR-SD02
Distance from PPE_{5C}:	2,798 feet
Reference:	Figures 2 and 3 in Appendix A

4.1.4.3.1 <u>Sensitive Environments</u>

4.1.4.3.1.2 <u>Level II Concentrations</u>

<u>Sensitive Environments</u>

No listed sensitive environments subject to Level II concentrations have been documented within the 15-mile downstream TDL.

<u>Total Length of Wetlands - Source 5</u>

The PPE of hazardous substances from Source 5 into surface waters is into the wetlands documented to have covered the majority of Source 5 prior to landfilling. The total length of wetlands documented at Source 5 subject to Level II concentrations of hazardous substances is determined by measuring the total perimeter of historical wetlands documented at Source 5 (Ref. 81, Figure 3). This length, as calculated by the ArcView GIS 3.2 computer program, is 1.37 miles. The assigned HRS wetland rating for Source 5is 50 (Ref. 1, Table 4-24; Ref. 23; Ref. 81, Figure 3).

4.1.4.3.1.3 **Potential Contamination**

The Chesapeake Bay is documented as habitat used by threatened species within the 15-mile surface water TDL (Ref. 75). The Chesapeake Bay is coastal tidal waters, therefore the assigned dilution weight of 0.0001 is assigned from the HRS Final Rule, Table 4-13 (Ref. 1).

Chesapeake Bay:

Sensitive Environment	Distance from Probable Point of Entry to Nearest Point of Sensitive Environment	Reference	Sensitive Environment Values
Habitat known to be used by Federal designated or proposed endangered or threatened species:			
Bald Eagle (*Haliaeetus leucocephalus*)	0	75	75
Peregrine Falcon (*falco percyrmus*)	0	75	75

TOTAL: 150

Wetlands

Wetlands not counted as Level II targets occur along the Back River and Chesapeake Bay within the 15-mile downstream TDL. The length of these wetlands are provided below.

Back River

The total length of wetlands subject to potential contamination located along Back River within the TDL is 4.5 miles; therefore the assigned value is 150 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Chesapeake Bay

The total length of wetlands subject to potential contamination located downstream along the Chesapeake Bay within the TDL is 13.6 miles, therefore the wetlands assigned value is 350 (see Figure 6 in Appendix A) (Ref. 1, Table 4-24; Ref. 17).

Potential Contamination Factor Value

The potential contamination factor value (SP) is calculated as follows:

$$SP = \frac{(W + S)\ D}{10}$$

W = Value assigned for wetlands from HRS Table 4-24.
S = Value assigned for the sensitive environment from HRS Table 4-23.
D = Dilution weight assigned from HRS Table 4-13. Back River and Chesapeake Bay are coastal tidal waters (Ref. 17).

$$SP_{\textit{Back River}} = \frac{(150 + 0)\ .0001}{10} = 0.0015$$

$$SP_{\textit{Chesapeake Bay}} = \frac{(350 + 150)\ .0001}{10} = 0.005$$

$$SP_{\textit{Total}} = 0.0015 + 0.005 = 0.0065$$

Potential Contamination Factor Value (SP) = 0.0065